CANADIAN FORCES
HEALTH SERVICES

COMBAT MEDIC PROTOCOLS & PROCEDURES

Muliti Succurrimus

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RECORD OF AMENDMENTS

Date	Subject	Approved By
2 Sep 25	Approved for Issue.	Col S. D. Pirie, D IT&E

The Combat Medic Protocol and Procedure Manual (PPM) is authorized by the Surgeon General and issued under the direction of the following:

1. Combat Medic National Practice Leader; (CMD NPL)
2. SSO Clinical Capabilities; and, (SSO Clin Cap)
3. Director of IT&E (D IT&E)

How to submit for proposals for changes to the Scope of Practice OR Protocol and Procedure Manual

To suggest a review or change regarding the Scope of Practice (SoP) or Protocol and Procedure Manual (PPM), you can follow the following steps to ensure clear communication:

a. Identify the Issue or Change or Question

1. Clearly define the review or change, you want to propose.
2. Be specific about what the current practice is and why you believe a change or review is needed, or why you have a question, label which point it is in SoP or PPM.

b. Gather Relevant Information

1. Collect data, examples, or evidence to support your suggestion if any.
2. This might include feedback from your unit, performance metrics, best practices, or industry trends.
3. If proposing a change, think about potential benefits and challenges.

c. Assess the Impact

1. Consider how the proposed change will impact the occupation and Health Services.
2. Will it improve efficiency, compliance, or employee satisfaction? Or will it resolve a problem or close a gap for the occupation?

d. Prepare a Clear and Concise Message

1. Provide a summary of the issue or proposal.
2. Outline and the reasoning behind the suggestion, and the potential benefits.
3. Include any evidence or supporting data to strengthen your case if any.
4. If proposing a change, offer a possible solution or action plan.

e. Email

- Send email to the National Practice Leader, to +Combat Medic MOSID Advisor NPL-Medic de Combat Conseiller DSGPMCNP@forces.gc.ca

f. **When a proposal or change has been received, before it can be accepted and implemented in either of the documents, it will be reviewed by the following:**
    - CMD NPL
    - SSO Clinical Capabilities
    - Director of IT&E
    - Pharmacy and Therapeutic Committee (if there are medications involved)
    - DHS Log (if medical equipment is involved)
    - SCOMR
    - Medical Clinical Counsel
    - Surgeon General Sign Off (if approved)

Foreword

This set of medical protocols and procedures has been developed in order to provide Combat Medics protocols that govern the clinical approach to assessment and treatment of casualties/patients of high acuity. This manual provides direction from which has been developed from the Scope of Practice for CMD for assessment and management of patients in different environments.

This manual is a comprehensive reference for use by CMD and these protocols are applicable to working in the pre-hospital, operational, holding care, prolonged care primary care, and Roles 1,2,3 areas of practice. It is intended to provide practice guidelines for application in emergent situations under remote supervision, or under remote supervision with written authorization or under direct supervision settings as part of a multidisciplinary team. Where available, a higher medical authority should always be consulted as soon as practical, and a transfer of care/evacuation should occur without delay.

This manual should not be taken as a simple menu of procedures to perform. Indeed, doing nothing unto itself is an intervention. It is up to each CMD, through formal training, experience, and participation in the Maintenance of Clinical Readiness Program (MCRP), to hone these skills, achieve professional excellence, and realize when these skills should or should not be performed. One of the hardest concepts in medical practice is understanding both your clinical expertise and limitations and then practicing in a manner consistent with this basic tenet of risk management.

Changes to this Manual are captured through a robust Record of Decision (ROD) Database, as noted in the Table of Contents. To familiarize oneself with updates or for a summary of historic changes, please visit on Education & Training | Providers | Health Services | MPC on DWAN

This document does not supersede or alter the CMD Scope of Practice.

Inquiries or suggestions for changes shall be forwarded through normal channels to the CMD National Practice Leader (NPL) at:

combatmedicmosidadvisornpl-medicdecombatconseilleridsgpmcnp@forces.gc.ca

Areas of Practice

1A – Prehospital Care;
1B – Enhanced Prehospital Care;
2A – Holding Care;
2B – Prolonged Casualty Care;
3 – Primary Care;
4 – Role 1 Care;
5 – Field Survival Skills; and
6 – Medical Service Specific Field Skills.

Autonomy of Practice

Under remote supervision: This allows the CMD to practice without direct supervision on the condition that they do so within the defined SoP, training, and within authorized protocols when issued. The CMDis not co-located with the supervising senior clinician and would be functioning largely independently with consultation where possible and clinical/leadership oversight only after the completion of the event.

Under remote supervision and written authorization: This allows the CMD to practice without direct supervision on the condition that they do so within the defined SoP, training, and within authorized protocols when issued. The CMD is not co-located with the supervising senior clinician and would be functioning largely independently with consultation where possible and clinical/leadership oversight only after the completion of the event. Written authorization from a medical officer must occur for these skills to be utilized.

Under direct supervision: This allows the CMD to work under the immediate direction and supervision of a more senior clinician. A more senior clinician must be consulted prior to executing these activities within the SoP.

Phases of Care

The protocols contained in this manual provide an algorithmic approach to patient assessment and care, with each protocol focused on a specific condition, injury pattern or illness. **Comprehensive clinical assessment and management requires applying protocols within an overarching, logical sequential approach.** Aggressive management of life-threatening conditions, with a focus on early, highly-quality BLS, is the foundation of this approach. **The following phases Care Under Fire and Tactical Field Care should be used to dictate sequence and prioritize life-saving interventions, particularly in environments with a tactical nexus.** Even in a non-tactical environment, the MARCHE algorithm provides a more detailed approach than the conventional Primary and Secondary surveys.

Legend / Classes Defined

Rank Qualification (RQ):

This manual denotes all skills and protocols for a CMD from the rank of Pte to MWO.

Classification of Protocols

A BLUE box within a protocol indicates a **Class B Protocols** which can only be performed under the signed authorization of a Medical Officer. This authorization will be limited in duration as directed in the **Authorization for Combat Medic Enhanced Scope of Practice**

Authorization for Combat Medic Enhanced Scope of Practice

SN	Rank	Name	Unit
_____	____	_____	_____

Is hereby authorized to provide enhanced operational casualty care in accordance with Area 1B of the Combat Medic Scope of Practice and their authorized Class B type protocols & procedures or another skill or medication as directed by the Medical Officer. While employed on operation or assessed as a task conducted under similar conditions:

Operation / Task Name: _____

This authorization is valid as of the date below and only within the task's specific area & timeline. Authorization ends upon completion of named operation or task listed above.

Date of Commencement: _____

Signature of Medical Officer: _____

SN	Rank	Name of Medical Officer	Appointment
_____	____	_____	_____

Copy 1: Monitor Mass
Copy 2: Unit File
Copy 3: Member

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SECTION 1

CARDIAC PROTOCOLS

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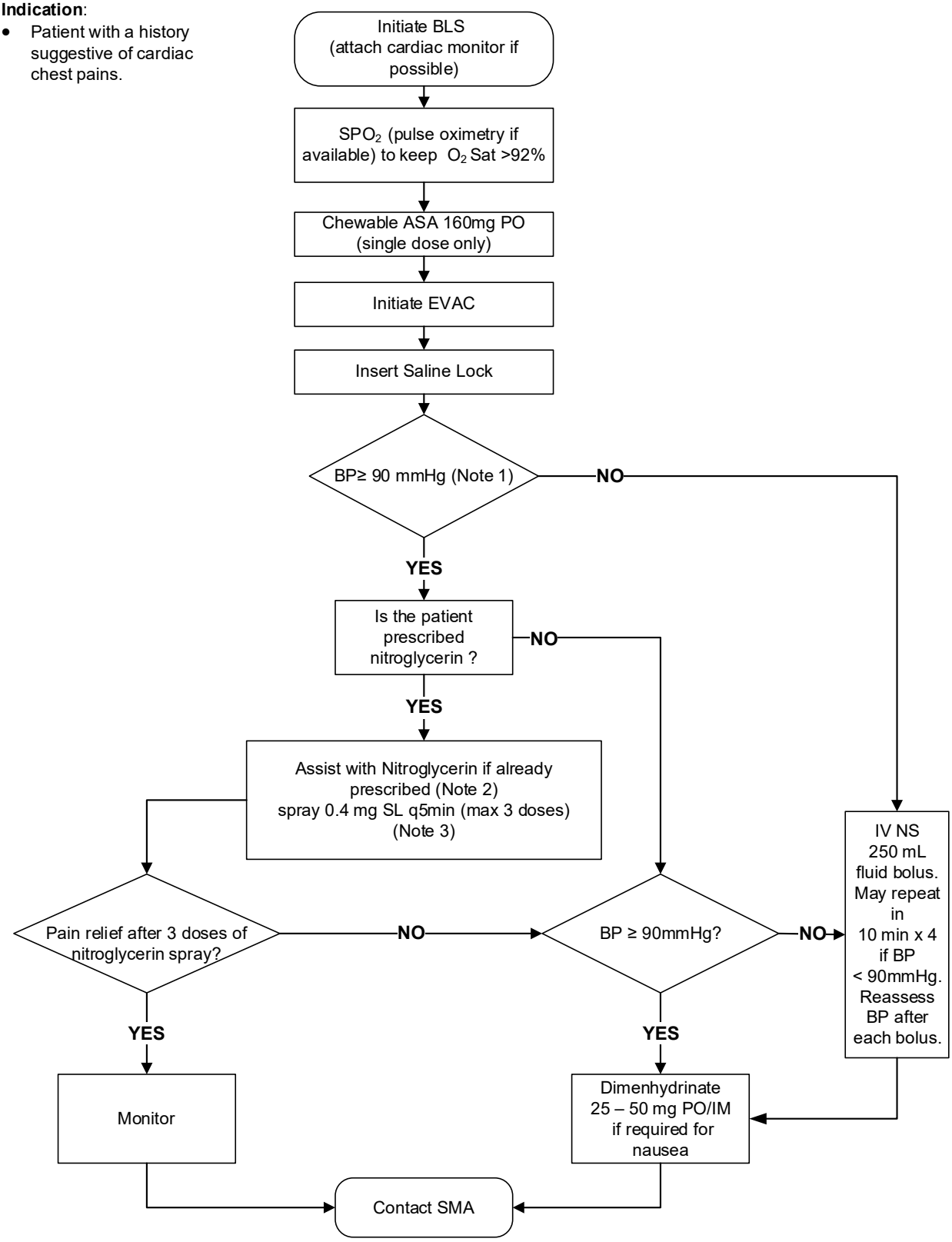
1.1 Suspected Cardiac Chest Pain

Indication:

- Patient with a history suggestive of cardiac chest pains.



Notes*:*

1. If unable to take BP, monitor radial pulse and mental status.
2. Do not give Nitroglycerin if HR < 60bpm. Ensure patient has not recently taken drugs for erectile dysfunction such as Viagra, Cialis, Levitra, Staxyn. (Within the last 24hrs.)
3. Nitroglycerin is only to be assisted if the patient already has the prescription on them in person. Measure vital signs between doses and / or prior to subsequent doses. Repeat q30mins as required. Do not administer Nitroglycerin if it is not possible to take a manual blood pressure reading **or** if BP systolic drops below 90mmHg.

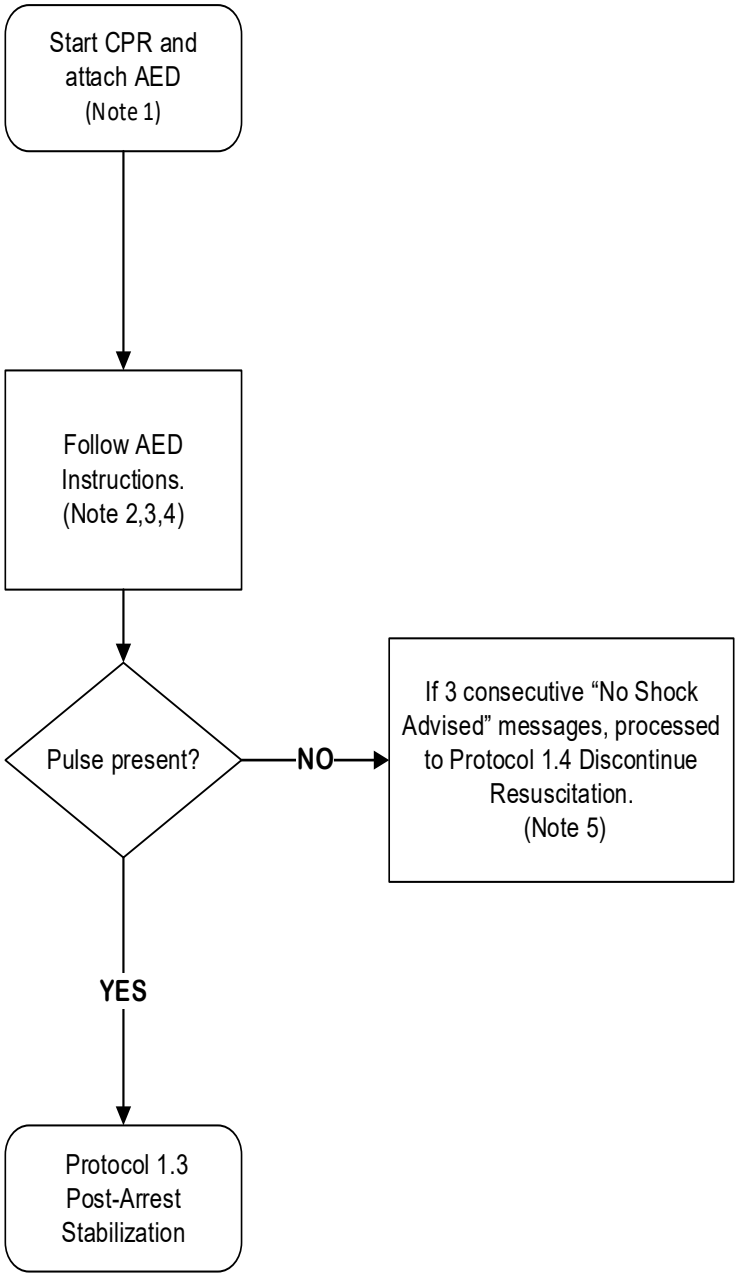
1.2 Cardiac Arrest AED Protocol

Indication:

- Patient with absent carotid pulse AND continued loss of consciousness AND not breathing.

Cautions:

- Severe hypothermia
- Asphyxiation
- Traumatic Arrest



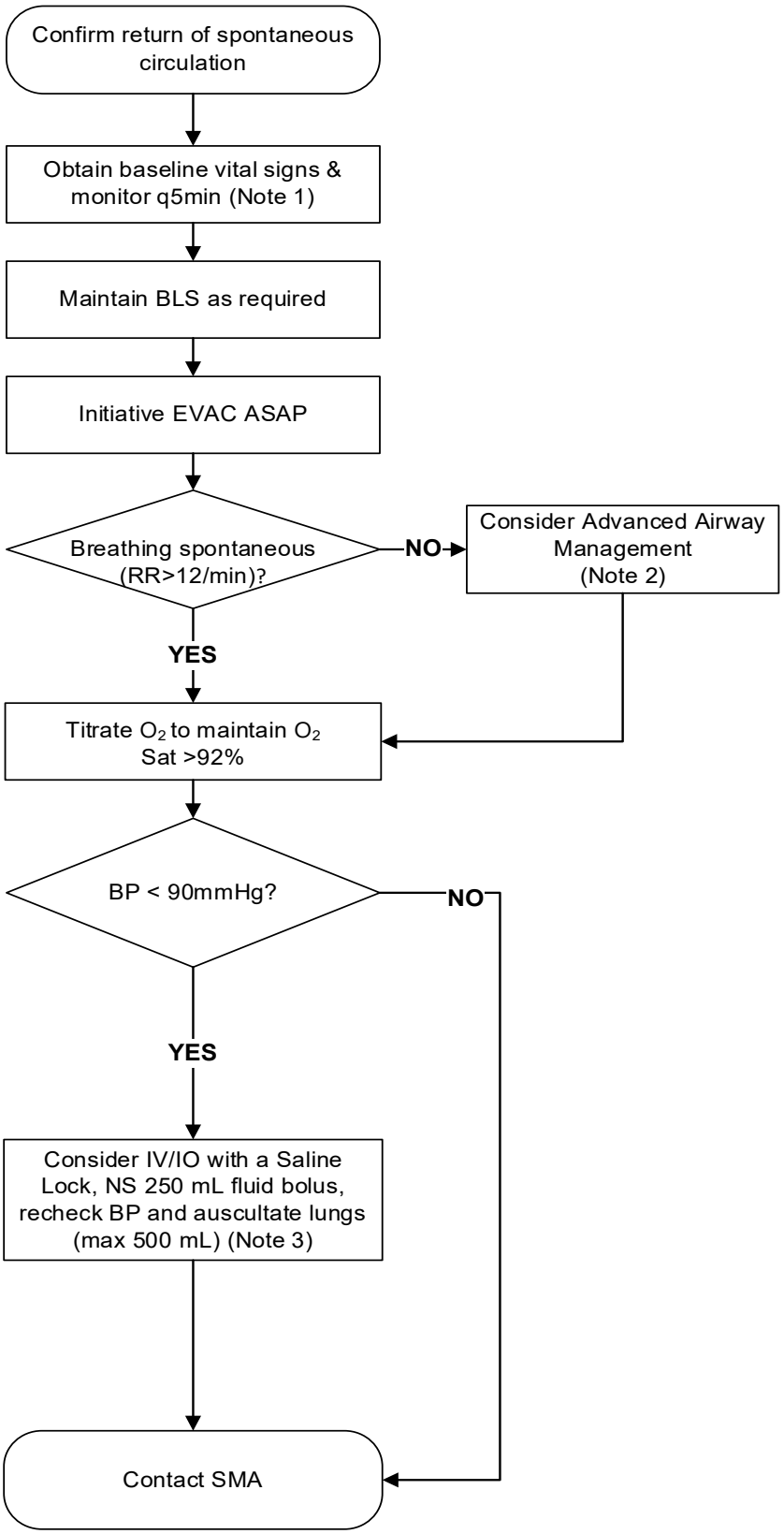
Notes*:*

1. Push hard (at least 2 inches) 5cm and fast (100-120/min) allow complete chest recoil. Minimize interruptions in compressions and avoid excessive ventilation.
2. Defibrillation is less likely to be effective below 30ºC core body temperature. Focus effort on CPR and rapid transport. Rewarm patient per Protocol 5.1 Hypothermia. Only defibrillate once until patient rewarms to 30ºC.
3. In asphyxiation, cardiac arrest is due to hypoxia. Emphasis should be on good oxygenation and initialing CPR before using AED. Causes may include hanging, airway obstruction, smoke inhalation, or drowning.
4. Use pediatric pads for ages 1-8 years old if available.
5. Cardiac arrest following trauma has a very low probability of survival. Resuscitative efforts should be based on available resources and operational requirements.

1.3 Post Cardiac Arrest Stabilization

Indication:

- Patient post-cardiac arrest with a pulse ± spontaneous respirations.



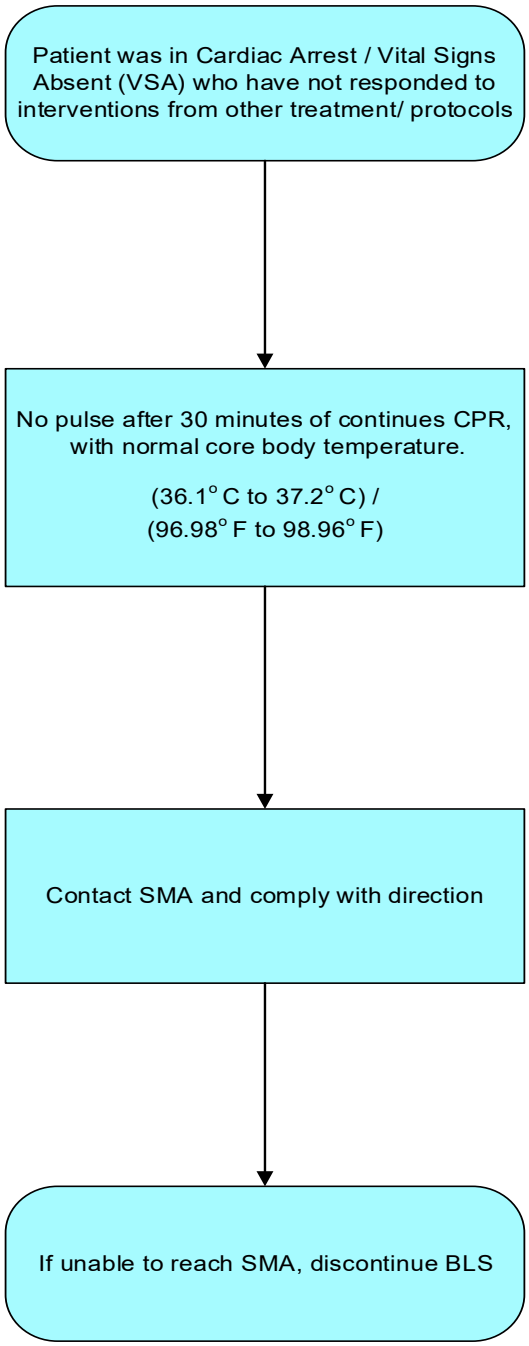
Notes*:*

1. Constant monitoring of patient's pulse is critical in the first 10 minutes post-arrest.
2. Supplemental O_2 to maintain O_2 Sat >92% see advanced Protocol 2.1 Airway Algorithm.
3. Caution in patient with pulmonary edema. Repeat BP and auscultate the lungs, this should be performed prior to and after each IV bolus, repeat to a **max of 500 mL** if required and no signs of Pulmonary Edema. Caution if signs of Pulmonary Edema, (SOB, crackles in lungs) are present, if heard contact SMA.

1.4 Discontinue Resuscitation (Adult)- Class B

Indication:

- Patient In cardiac arrest who have not responded to interventions under other treatments protocols.

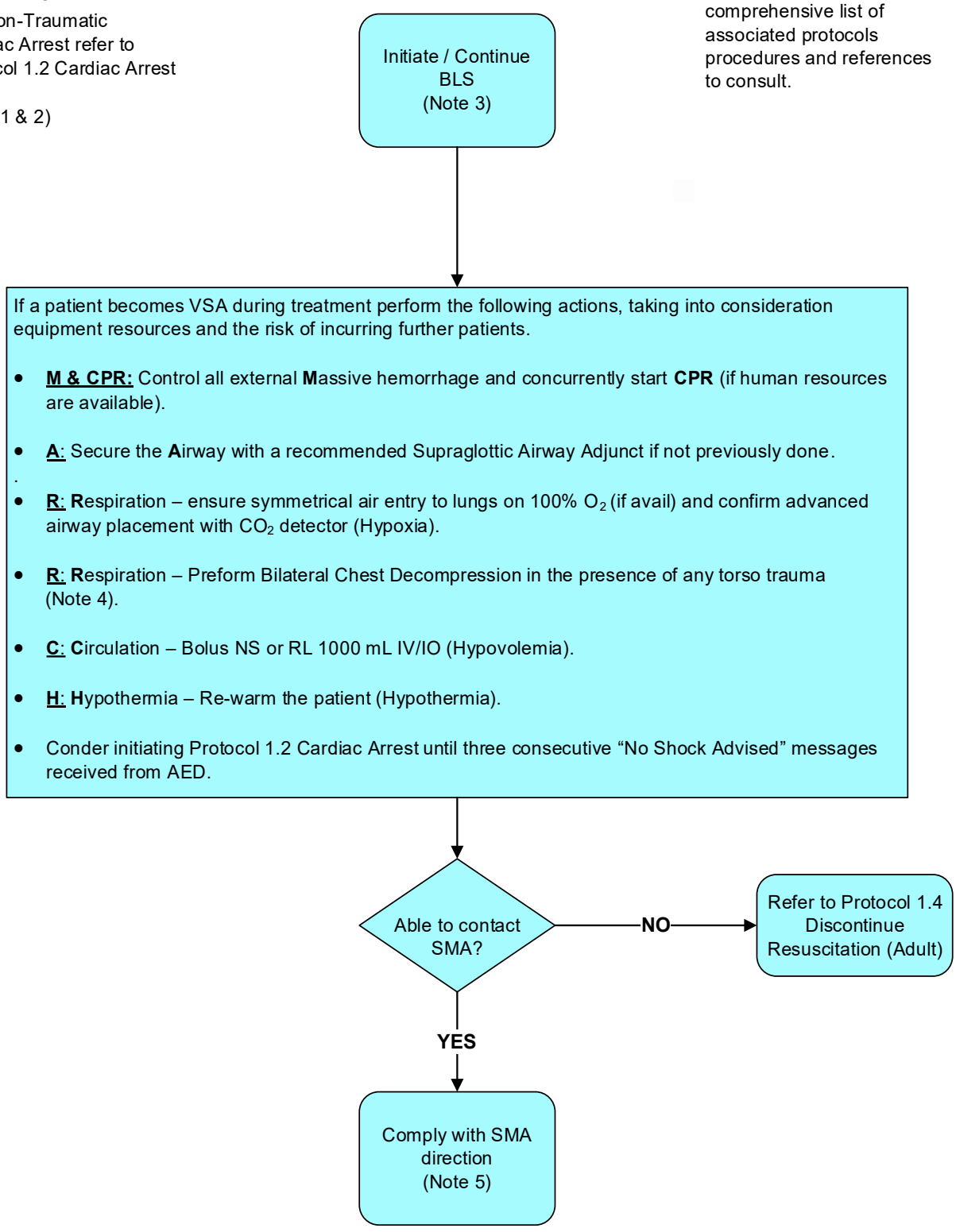


1.5 Vital Signs Absent Protocol – Class B

Indications:

- Patient initially presents with a pulse, then no palpable pulse detected.
- Traumatic Cardiac Arrest.
- For Non-Traumatic Cardiac Arrest refer to Protocol 1.2 Cardiac Arrest AED.
- (Note 1 & 2)

N.B. For interventions indicated below under MARCH(E) refer to Phases of Care – Tactical Field Care (Ref 8.31) for comprehensive list of associated protocols procedures and references to consult.



Notes*:*

1. Resuscitation including cardiopulmonary resuscitation (CPR). On the battlefield for victims of blast or penetrating trauma who are found with no pulse, no respiration, and no other signs of life., will not be successful and should not be attempted. This casualty is considered. KIA
2. In an environment other than a battlefield, initiate the VSA Protocol where resources, time and situation permit it. Resuscitative effort should not be attempted in case of obvious fatal injury (e.g., Decapitation) or when evidence exists of dependent lividity, rigor mortis, or decomposition.
3. Special considerations: Continue resuscitation on hypothermic; near-drowning victims; pediatric victims; or victims of electrocution or lightning strikes.
4. Perform a bilateral chest decompression for traumatic arrests where the cause is penetrating or blunt trauma to the torso area, the cause is unknown, or not definitively clear. Generally, our battlefield injuries involve polytrauma where tension pneumothoraxes cannot be ruled out. As such, Bilateral Chest Decompression is generally among the expected interventions/treatments. In case of traumatic arrest where trauma (Penetrating or Blunt) to the torso area can be effectively eliminated, a bilateral decompression may not be indicated (i.e. GSW to the leg; Blunt trauma to the head; etc.).
5. Where possible, SMA should be contacted to provide direction on the discontinuation of resuscitation.

SECTION 2

RESPIRATORY PROTOCOLS

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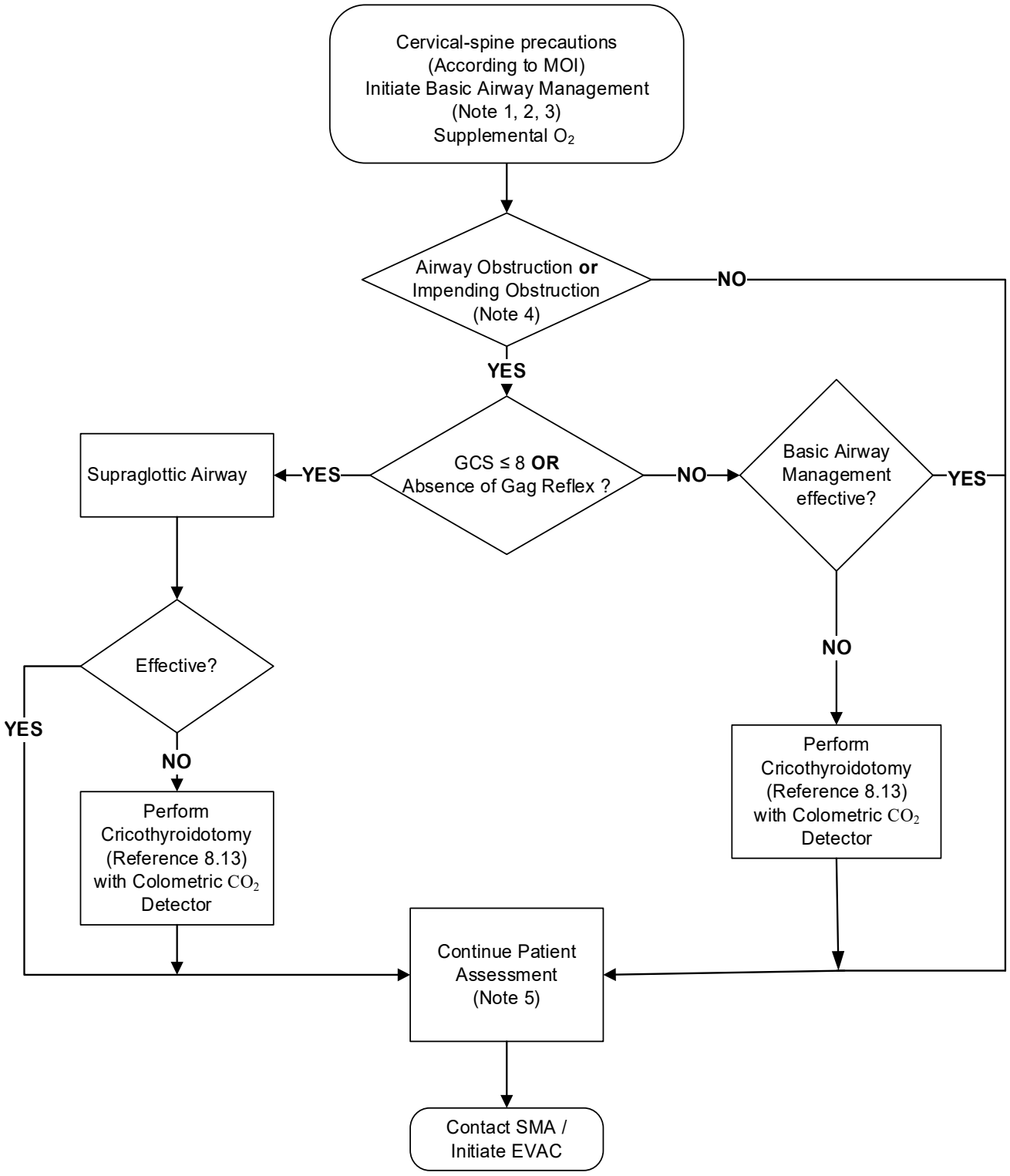
2.1	Airway Algorithm	**22**
2.2	SOB- Suggestive of Asthma/COPD (Adult)	**24**
2.3	Anaphylaxis/Anaphylactic Shock - Adult & Children ≤ 30kg	**26**
2.4	Anaphylaxis/Anaphylactic Shock - Adult & Children > 30kg	**29**

2.1 Airway Algorithm



Notes*:*

1. Positioning; Chin-lift, Jaw-thrust; Head-tilt-chin-left; NPA; OPA; BVM and suctioning if available. (Reference 8.12 – Airway Management Techniques).
2. Always be prepared to escalate to next level of airway management. Reassess at each intervention. Do not delay airway interventions to initiate O_2 **or** SPO_2 monitoring.
3. Allow a conscious patient to assume any position that best protects the airway, to include sitting up/or learning forward.
4. E.g., Edema from facial trauma; Burns to the face and upper airway; smoke inhalation injury; Angioedema in anaphylaxis.
5. Airway should be reassessed frequently, and the CMD should be prepared to escalate management measures. After addressing all life-threatening injuries, the CMD can consider converting an NPA/OPA to a supraglottic airway device to obtain more reliable protection of the airway (in the unconscious patient without an intact gag reflex).

2.2 SOB Suggestive of Asthma / COPD (Adult)

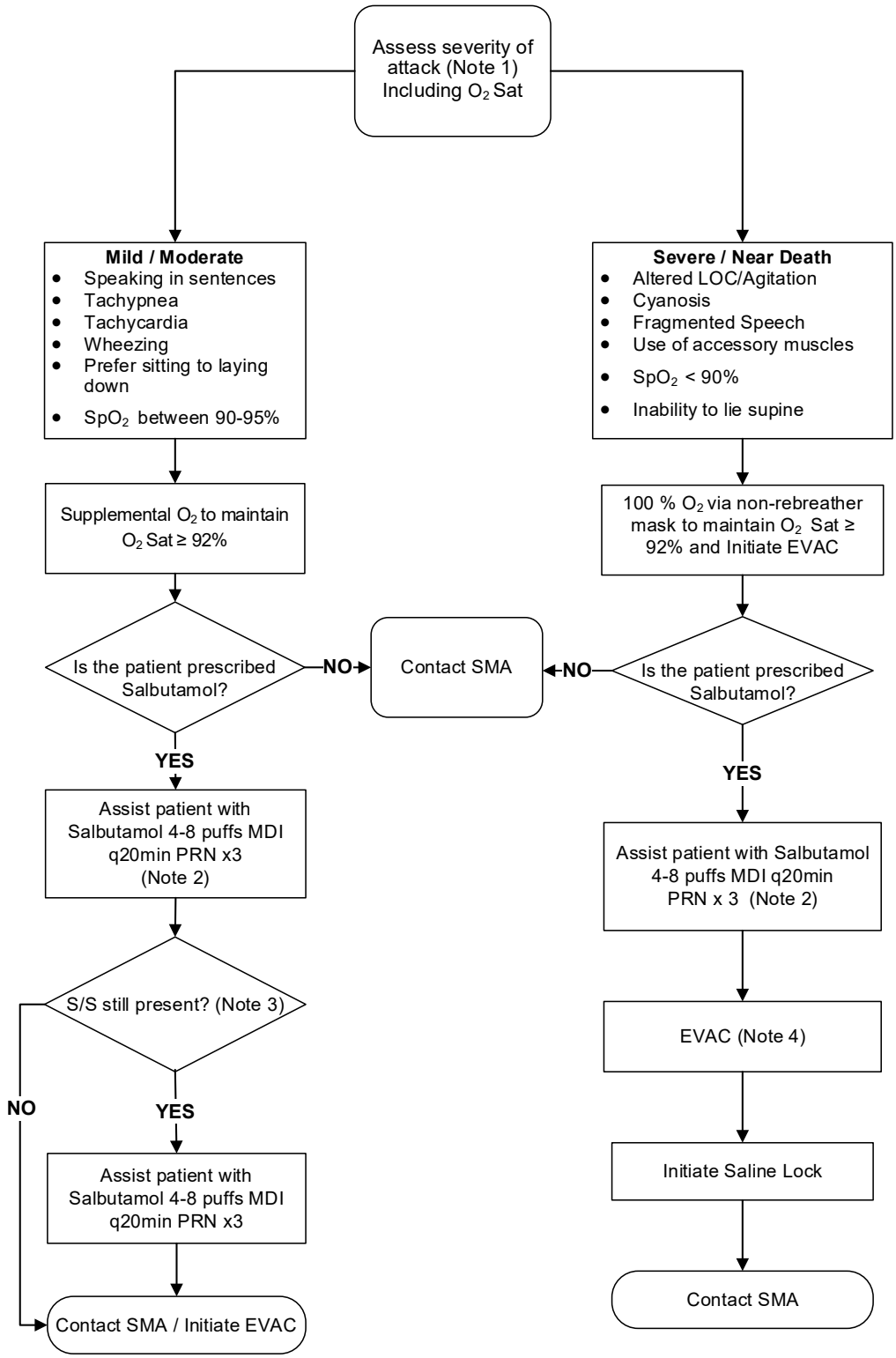
Indication:

- Patient who are SOB with a history of asthma or chronic obstructive; pulmonary disease (COPD) or are wheezing.

Caution:

- In patients > 50 yrs (Note 5)

***N.B**: For patients <18 yrs. Contact SMA*



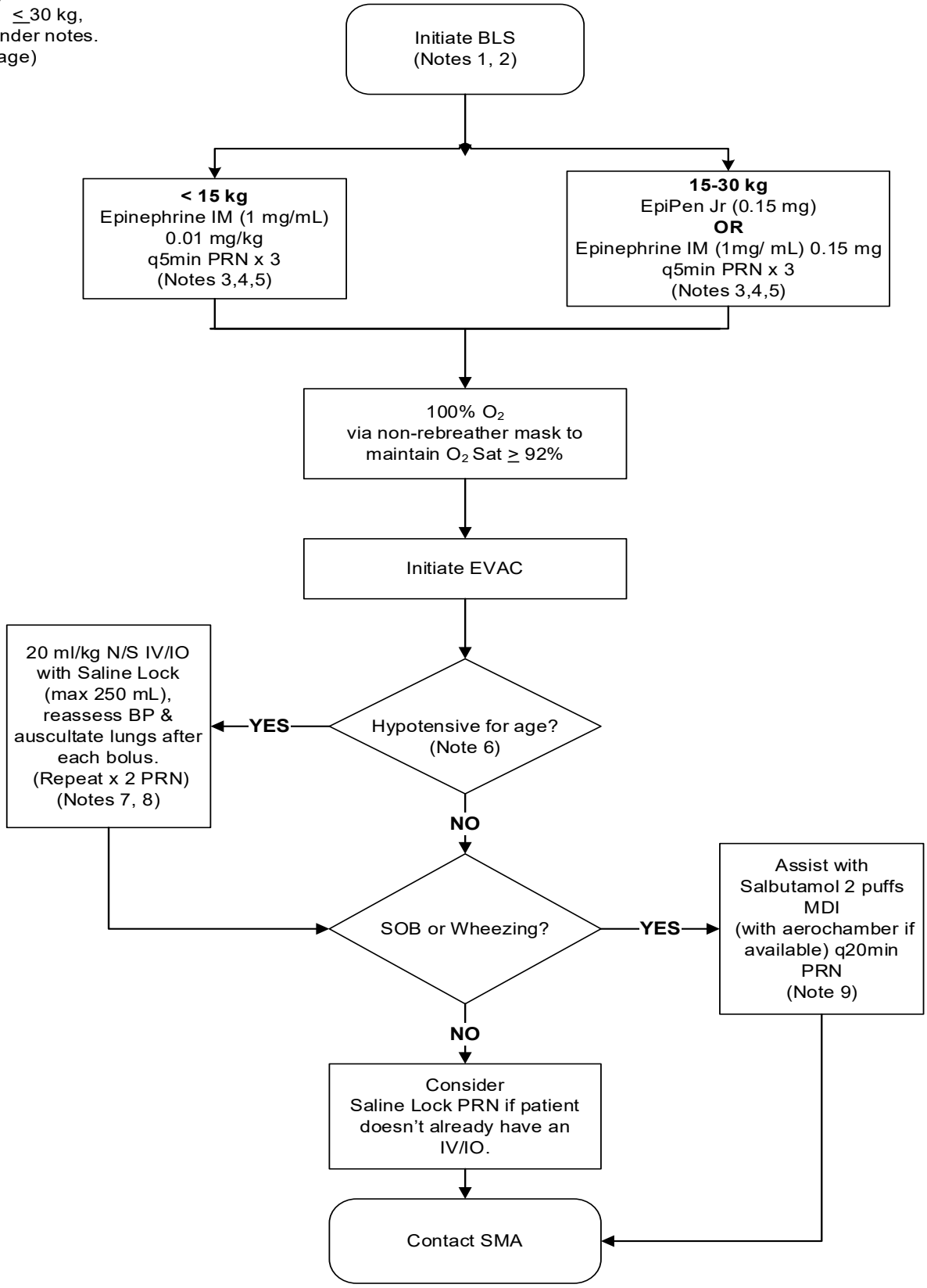
Notes:

1. Use of accessory muscles of respiration; Brief, fragmented speech, Inability to lie supine; profound diaphoresis; and Agitation are severe symptoms. Inability to maintain respiratory effort; Cyanosis; and Depressed mental status predict imminent respiratory arrest.
2. In the absence of prescription label for the Salbutamol inhaler, assist the patient with the administration of 4-8 puffs of Salbutamol every 20min PRN x 3. If the patient indicates they have a prescription, but it is not on hand, provide Salbutamol inhaler from your medical kit in accordance with protocol.
3. Anytime during treatment, if the patient condition worsens, consider if the Severe/Near Death algorithm is indicated.
4. If evacuation platform is available, do not delay transport for subsequent treatments.
5. Patients who are 50+, the likelihood of other ethnologies with a similar presentation increase. With increasing age, the provider must exercise greater caution that additional diagnostic and different treatment inventions may be required, and the treatments in this protocol can harm.

2.3 Anaphylaxis / Anaphylactic Shock – Adult & Children ≤30Kg

Indication:

- Refer to Diagnostic Criteria for Anaphylaxis Adult & Child ≤ 30 kg, listed under notes. (next page)



Notes:

1. If airway compromised refer to Protocol 2.1 Airway Algorithm.
2. Remove suspected offending agent.
3. Assess for airway obstruction and hypotension after each dose of Epinephrine.
4. Keep EpiPen needle in the muscle for 5 seconds.
5. If you use Epinephrine ampule, remember that it contains more than 1 dose.
6. Refer to Pediatric Table (vitals) 8.38.
7. Patients should be monitored carefully and continuously for clinical response and for volume overload.
8. Massive fluid shifts can occur rapidly due to increased vascular permeability, with transfer of up to 35% of the intravascular volume into the extravascular space within minutes. Any patient whose hypotension does not respond promptly and completely to IM Epi may require large volume fluid resuscitation. Contact SMA for serial of bolus.
9. In the absence of prescription label for the Salbutamol inhaler, assist the patient with the administration of 2 puffs of Salbutamol every 20 min. If the patient indicates they have a prescription, but it is not on hand, provide Salbutamol inhaler from your medical kit in accordance with protocol.

Anaphylaxis Criteria

Anaphylaxis is highly likely when any **ONE** of the following 3 criteria are fulfilled:

1. Acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue, or both (e.g., generalized hives, pruritus or flushing, swollen lips-tongue-uvula)
   AND AT LEAST ONE OF THE FOLLOWING
   A. Respiratory compromise (e.g., dyspnea, wheeze-bronchospasm, stridor, SPO_2 <92%)
   B. Reduced BP* or absent radial pulse or decreased level of consciousness

2. **TWO OR MORE OF THE FOLLOWING** that occur rapidly after exposure to a likely allergen for that patient (minutes to several hours):
   A. Involvement of the skin-mucosal tissue (e.g., generalized hives, itch-flush, swollen lips-tongue- uvula)
   B. Respiratory compromise (e.g., dyspnea, wheeze-bronchospasm, stridor, SPO_2 <92%)
   C. Reduced BP* or absent radial pulse or decreased level of consciousness
   D. Persistent gastrointestinal symptoms (e.g., crampy abdominal pain, vomiting)

3. Reduced BP* after exposure to a known allergen for that patient (minutes to several hours):
   A. Infants and children: low systolic BP (age specific) * or greater than 30% decrease in systolic BP

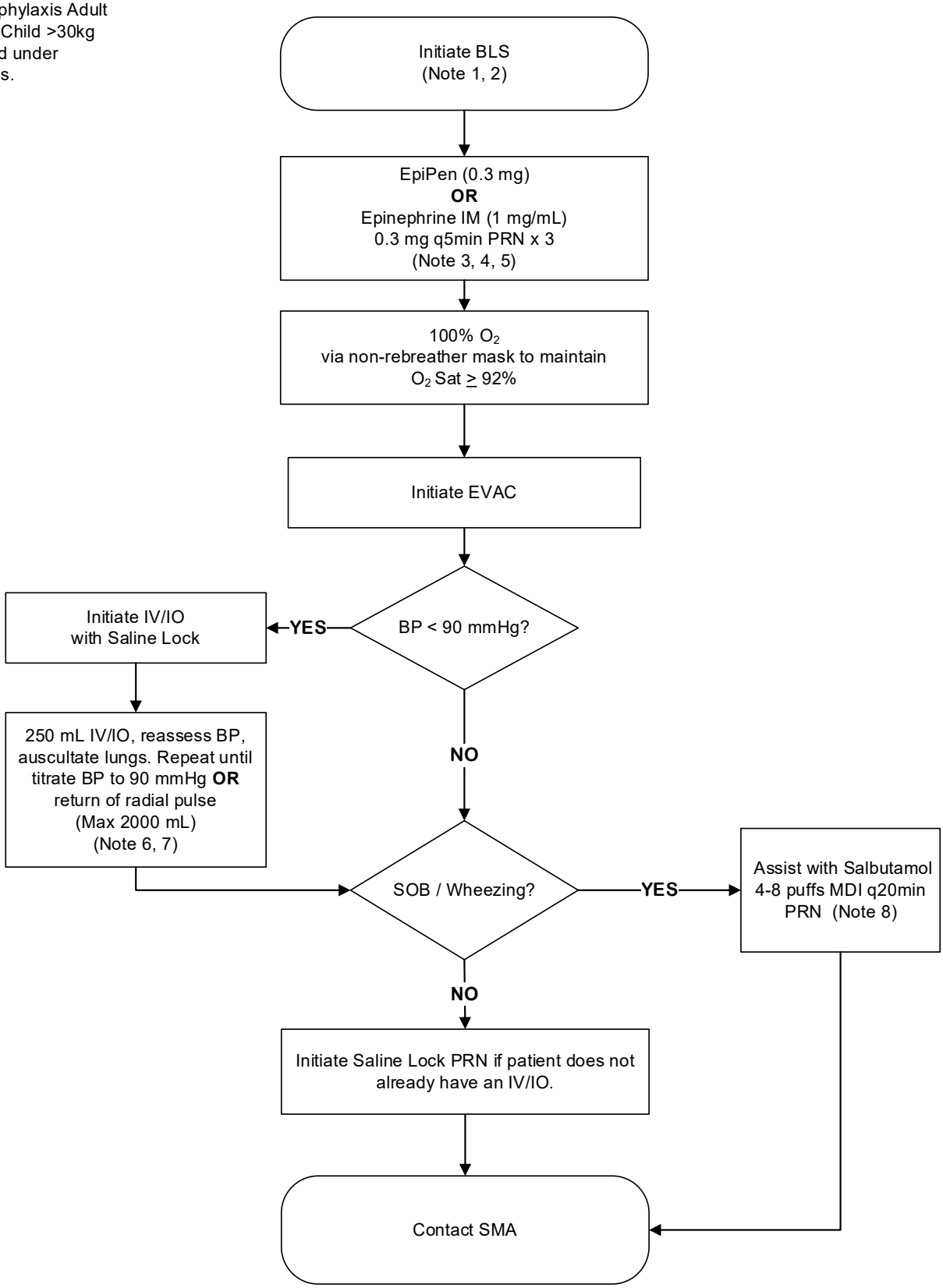
*Low systolic blood pressure for children is defined as:

- less than 70mmHg from 1 month to 1yr,
- less than (70mmHg + [2 x age]) from 1-10yrs, and
- less than 90mmHg from 11-17yrs.

2.4 Anaphylaxis / Anaphylactic Shock – Adult & Children > 30kg

Indication:

- Refer Diagnostic Criteria for Anaphylaxis Adult and Child >30kg listed under notes.



Notes*:*

1. If airway compromised, refer to Protocol 2.1 Airway Algorithm.
2. Remove suspected offending agent.
3. Assess for airway obstruction and hypotension after each dose of Epinephrine.
4. Keep EpiPen* needle in the muscle for 5 seconds.
5. If you use Epinephrine ampule, remember that it contains more than one dose in each ampule.
6. Patients should be monitored carefully and continuously, for clinical response and for volume overload. Auscultate lungs before and after every bolus.
7. Massive fluid shifts can occur rapidly due to increased vascular permeability, with transfer up to 35% of the intravascular volume into the extravascular space within minutes. Any patient whose hypotension does not respond promptly and completely to IM Epinephrine may require large volume fluid resuscitation. Contact SMA for serial boluses.
8. In the absence of prescription label for the Salbutamol inhaler, assist the patient with the administration of 4-8 puffs of Salbutamol every 20mins PRN. If the patient indicates they have a prescription, but it is not on hand, provide Salbutamol inhaler from your medical kit in accordance with protocol.

Anaphylaxis Criteria:

Anaphylaxis is highly likely when any **ONE** of the following 3 criteria are fulfilled:

1. Acute onset of an illness (minutes to several hours) with involvement of the skin, mucosal tissue, or both (e.g., generalized hives, pruritus or flushing, swollen lips-tongue-uvula)

   AND AT LEAST ONE OF THE FOLLOWING

   A. Respiratory compromise (e.g., dyspnea, wheeze-bronchospasm, stridor, SPO2 < 92%)

   B. Reduced BP* or absent radial pulse or decreased level of consciousness

2. **TWO OR MORE OF THE FOLLOWING** that occur rapidly after exposure to a likely allergen for that patient (minutes to several hours):

   A. Involvement of the skin-mucosal tissue (e.g., generalized hives, itch-flush, swollen lips-tongue- uvula)
   B. Respiratory compromise (e.g., dyspnea, wheeze-bronchospasm, stridor, SPO2 <92%)
   C. Reduced BP* or absent radial pulse or decreased level of consciousness
   D. Persistent gastrointestinal symptoms (e.g., crampy abdominal pain, vomiting)

3. Reduced BP* after exposure to a known allergen for that patient (minutes to several hours):

   A. Adults: systolic BP of less than 90 mmHg or greater than 30 percent decrease from that person's baseline
   B. Infants and children: low systolic BP (age specific) * or greater than 30 percent decreases in systolic BP

Section 3

TRAUMA PROTOCOLS

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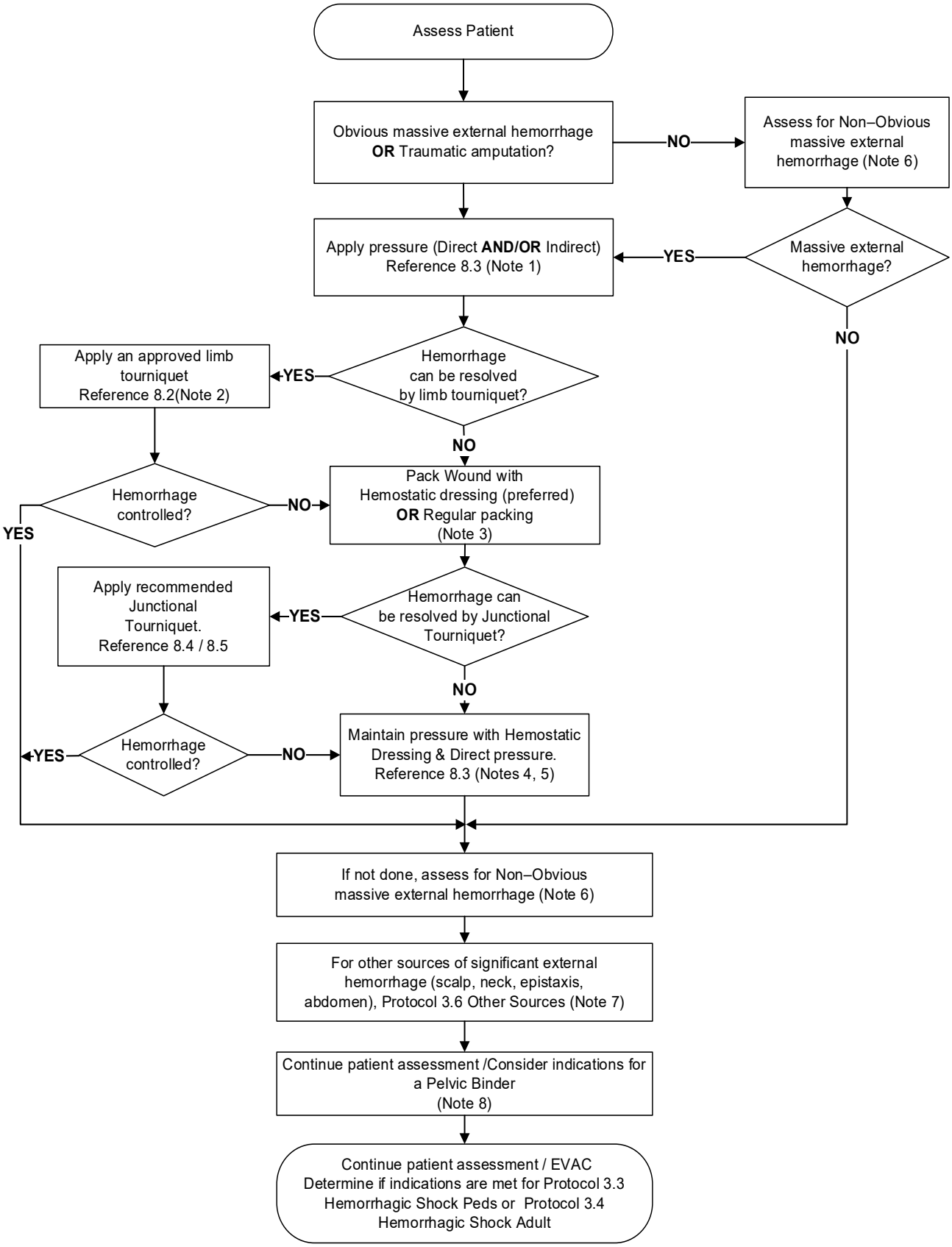
3.1 Massive External Hemorrhage



Notes*:*

1. If direct pressure is effective in controlling all life-threatening hemorrhage, assess airway. If airway is compromised, hemorrhage control and airway management should be done concurrently with additional help if available.
2. A 2nd TQ, and in some cases 3rd TQ, may be required to control the hemorrhage before moving to hemostatic dressing. (Reference 8.3 Assessing & Treating Hemorrhage)
3. Packing should not be done on wound in the abdominal, thoracic or cranial cavity.
4. If hemostatic dressing fails to control bleeding after adequate pressure, remove hemostatic dressing and attempt a 2nd application with new hemostatic dressing.
5. Manual pressure should be maintained for 5mins then secure with a pressure dressing. If hemostatic dressing is not available, use plain gauze and maintain pressure for 10mins.
6. The assessment should start at the inguinal region, both legs, the neck, axilla and then both arms.
7. If the bleeding from a wound that is of significant rate in the opinion of the Combat Medic, enough to compromise the hemodynamic status of the patient immediately or in the near future without treatment. (Refer to Protocol 3.6 Other Sources of External Hemorrhage)
8. Needs to be applied before moving the casualty.

Indications for pelvic binder:

a. Penetrating or blunt pelvic trauma;
b. Unexplained hypotension in suspected or known blunt or blast trauma;
c. Blast injury with lower limb amputation or partial amputation;
d. Complaints of pelvic pain or pelvis tenderness on examination.

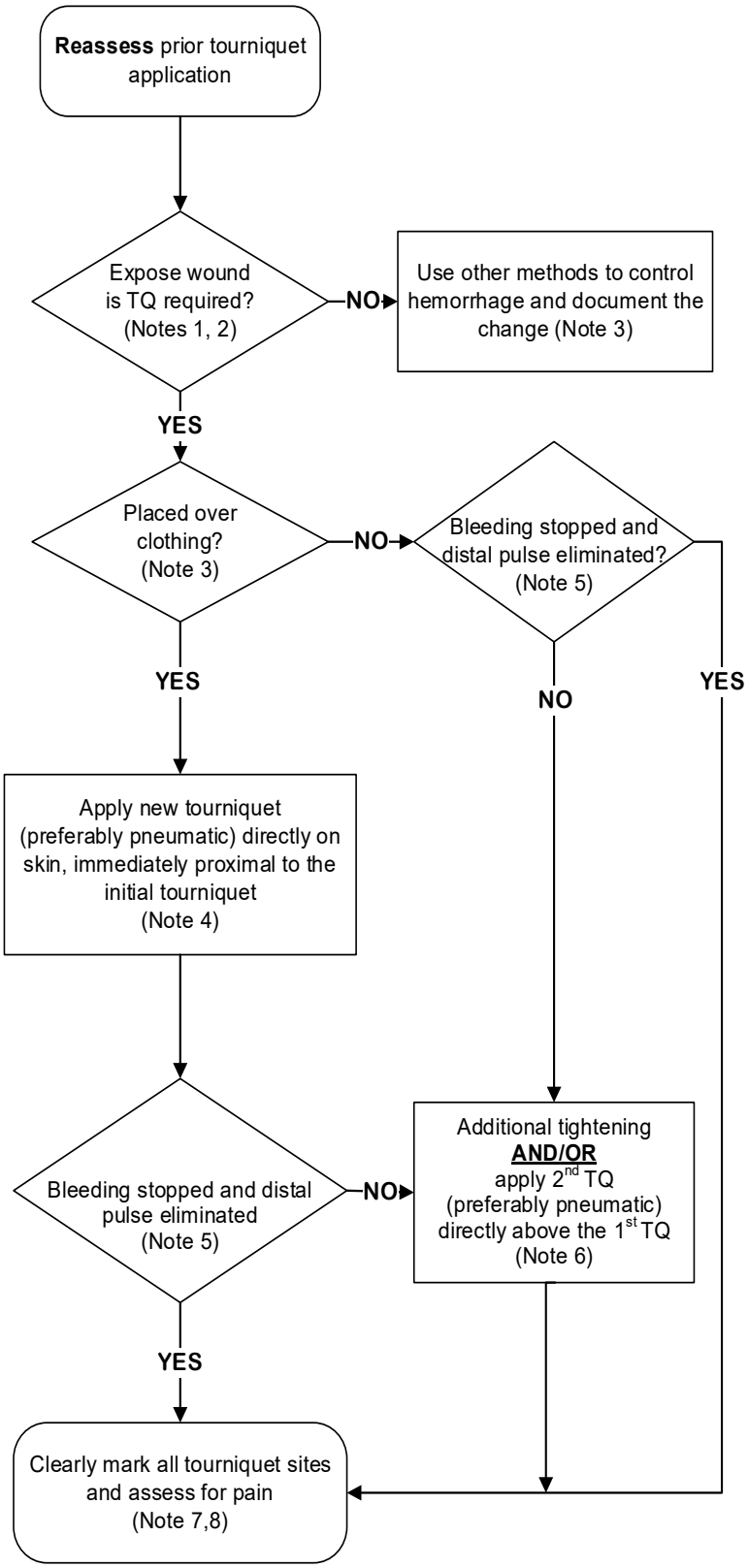
3.2 Tourniquet Assessment, Replacement or Conversion

Indications:

- Conditions under which a limb tourniquet may be considered for replacement/ conversion:
- Effective hemorrhage control can be continuously maintained by other means;
- To replace a strap style tourniquet with a pneumatic tourniquet when there is a minimal risk of puncture;
- To replace a tourniquet that was placed over clothing during CUF.
- High and tight

Contraindications for conversion:

- Tourniquets have been in place for ≥ 4 hours
- Complete amputation;
- Patient is in hemorrhagic shock or has decreased level of consciousness presumed secondary to hemorrhagic shock;
- If you cannot monitor the limb continuously for re-bleeding



Notes*:*

1. Contraindications for conversion of a limb tourniquet (TQ) to a hemostatic dressing and/or pressure dressing:

    a. Complete amputation;
    b. Patient is in hemorrhagic shock or has decreased level of consciousness presumed secondary to hemorrhagic shock;
    c. If you cannot monitor the limb continuously for re-bleeding;
    d. TQ has been in place $\geq$ 4hrs

2. Every effort should be made to convert tourniquets in less than 2hrs. if bleeding can be controlled by other means.

3. If the tourniquet was placed over clothing or is not required, refer to Procedure 8.2 Tourniquet Assessment, Replacement or Conversion.

4. Do not apply a tourniquet over a joint. If a tourniquet needs to be applied above the knee, apply it at least 5 cm (2 inches) above the medial femoral condyle to avoid the adductor hiatus. For an initial TQ applied "high and tight “, over clothing during CUF, apply the new TQ on skin, 2-3 inches above the wound. For Tourniquet Assessment Replacement or Conversion, (Reference Procedure 8.2).

5. Bleeding from bone marrow is normal and not indicative of tourniquet ineffectiveness. Slow bleeding from the marrow should be controlled with dressing and elevation.

6. If hemorrhage is still active where 2 tourniquets have been applied to a lower limb (below the elbow or knee), a 3rd tourniquet above the knee/elbow is indicated before proceeding to other hemorrhage control means. (Refer to Protocol 3.1 Massive External Hemorrhage)

7. Clearly mark all tourniquet sites with the time of application. Note on patient documentation: Tourniquet application site and time of application; Time of re-application (if removed and re-applied); Time of conversion; Time of removal.

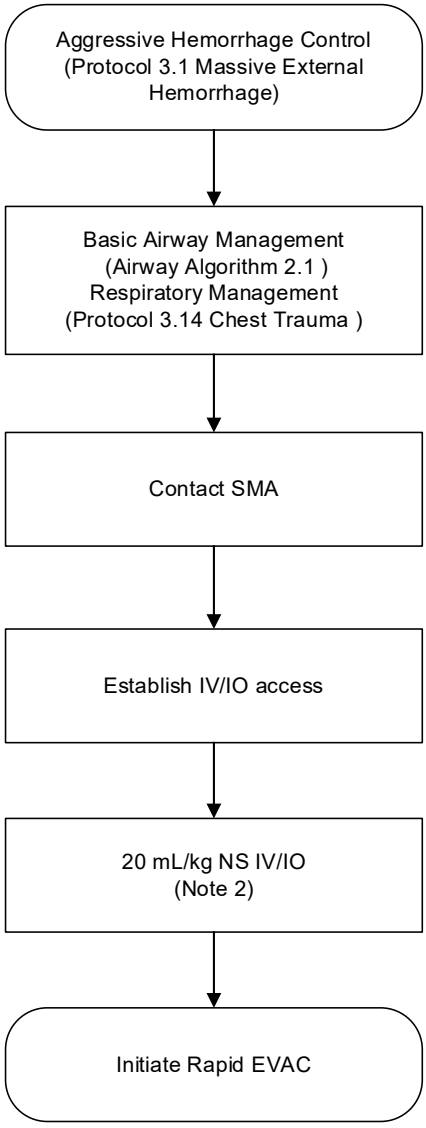
8. Continue to reassess patient and all injuries until handover to SMA.

***** See Reference 8.2 on Tourniquet Assessment, Replacement or Conversion**

3.3 Hemorrhagic Shock – Pediatric

Indications:

- Pediatric trauma patient injury pattern(s) predictive of massive hemorrhage and evidence of hemorrhagic shockevidence of significant hemorrhage:
- BP < 70mmHg + 2x age in years.
- (Note 1)



Notes*:*

1. Proximal/Bilateral/Multiple amputations: Clinically obvious penetrating injury to the chest or abdomen: Uncontrolled torso or junctional bleeding: Uncontrolled major bleeding secondary to large soft tissue injuries: Mangled extremity: Clinical signs of coagulopathy (e.g. difficulty with coagulation or petechial bleeding): and/or Severe Hypothermia in the trauma patient.
2. Permissive hypotension should not be utilized in the pediatric population.

Pediatric Table Vitals (approx. normal values) – Reference 8.40

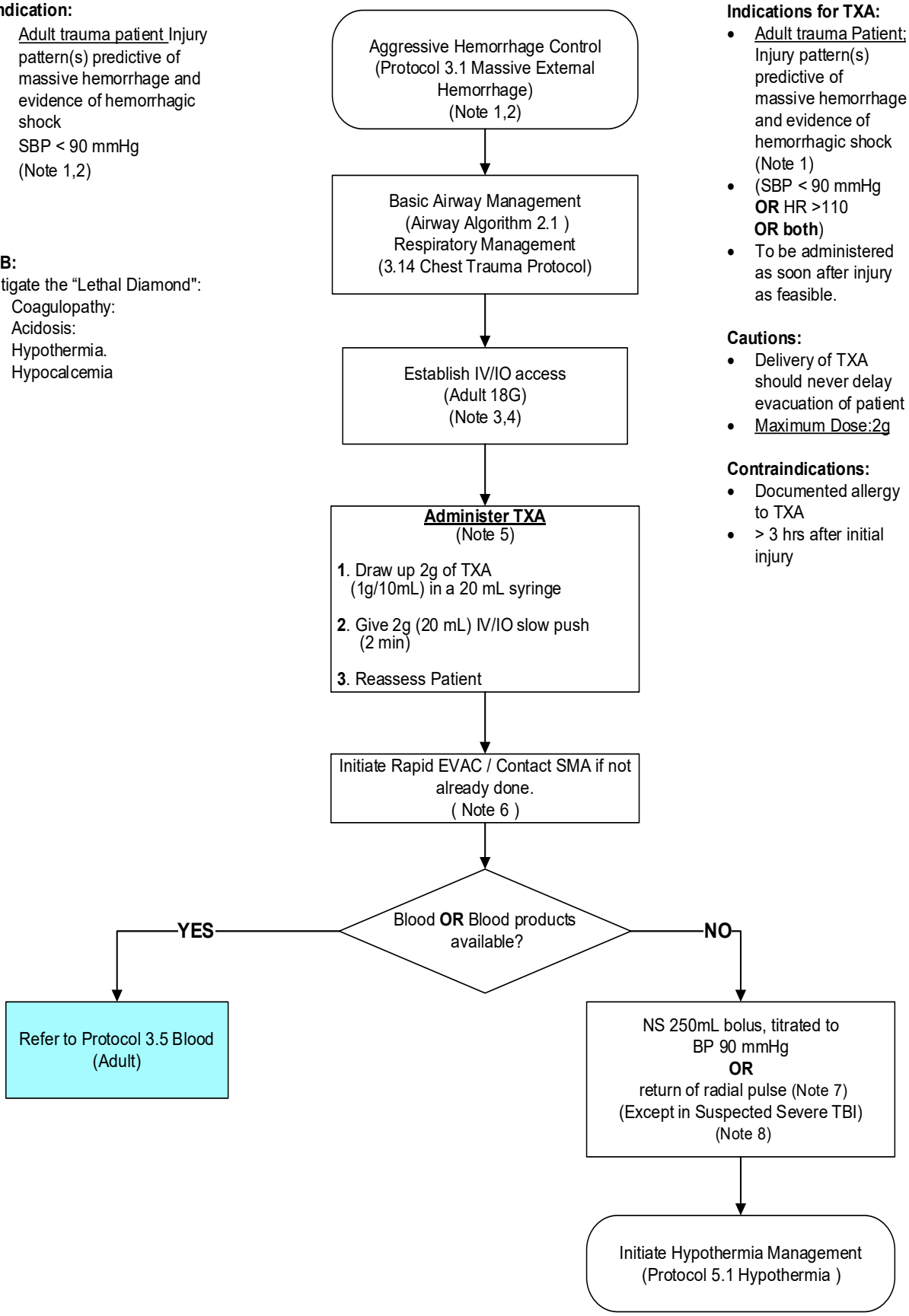
3.4 Hemorrhagic Shock - Adult

Indication:

- Adult trauma patient Injury pattern(s) predictive of massive hemorrhage and evidence of hemorrhagic shock
- SBP < 90 mmHg
- (Note 1,2)

N.B:
Mitigate the "Lethal Diamond":

- Coagulopathy:
- Acidosis:
- Hypothermia.
- Hypocalcemia



Indications for TXA:

- Adult trauma Patient; Injury pattern(s) predictive of massive hemorrhage and evidence of hemorrhagic shock (Note 1)
- (SBP < 90 mmHg **OR** HR >110 **OR both**)
- To be administered as soon after injury as feasible.

Cautions:

- Delivery of TXA should never delay evacuation of patient
- Maximum Dose:2g

Contraindications:

- Documented allergy to TXA
- > 3 hrs after initial injury

Notes:

1. Proximal/Bilateral/Multiple amputations: Clinically obvious penetrating injury to the chest or abdomen: Uncontrolled torso or junctional bleeding: Uncontrolled major bleeding secondary to large soft tissue injuries: Mangled extremity: Clinical signs of coagulopathy (e.g. difficulty with coagulation or petechial bleeding): and/or Severe Hypothermia in the trauma patient.
2. Classifications of Hemorrhagic Shock

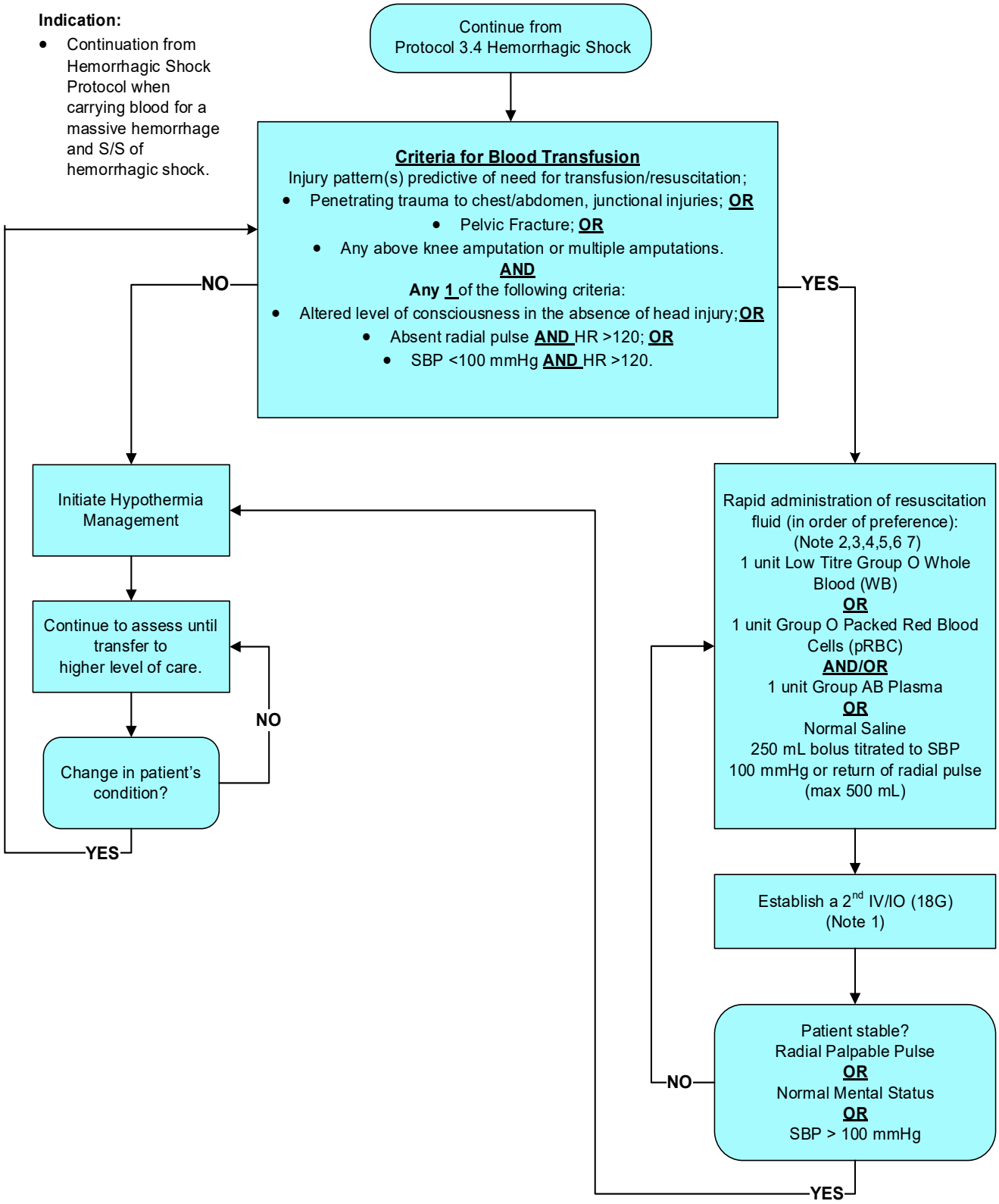
Signs	Class I	Class II	Class III	Class IV
Blood Loss (mL)	<750	750 to 1500	1500 to 2000	>2000
Pulse Rate	<100	100 to 120	120 to 140	>140
Blood Pressure	Normal	Normal	Decreased	Decreased
Ventilatory Rate	14 to 20	20 to 30	30 to 40	>35
Mental Status	Slightly Anxious	Mild Anxious	Anxious, Confused	Confused, Lethargic

3. Litter placement of the patient to prevent hypothermia.
4. Adult patients: minimum 18G IV catheter or larger bore, in case blood or blood products are required to be administered.
5. The IV/IO line needs to be completely flushed with Normal Saline after TXA administration, before blood or blood products can be infused in this IV/IO.
6. Initiate EVAC, contact SMA if not already completed, if unable to reach SMA continue with protocol.
7. After the first bolus, if the patient is responding positively or does not demonstrate deterioration attributable to increased hemorrhage, serial boluses of 250 mL NS (up to 1000 mL maximum of Normal Saline) can be given. Assess patient responsiveness and vitals between each bolus.
8. If Severe TBI is suspected, refer to Protocol 3.12 Severe TBI for fluid type and target BP.

3.5 Blood Protocol (Adults) - Class B

Indication:

- Continuation from Hemorrhagic Shock Protocol when carrying blood for a massive hemorrhage and S/S of hemorrhagic shock.



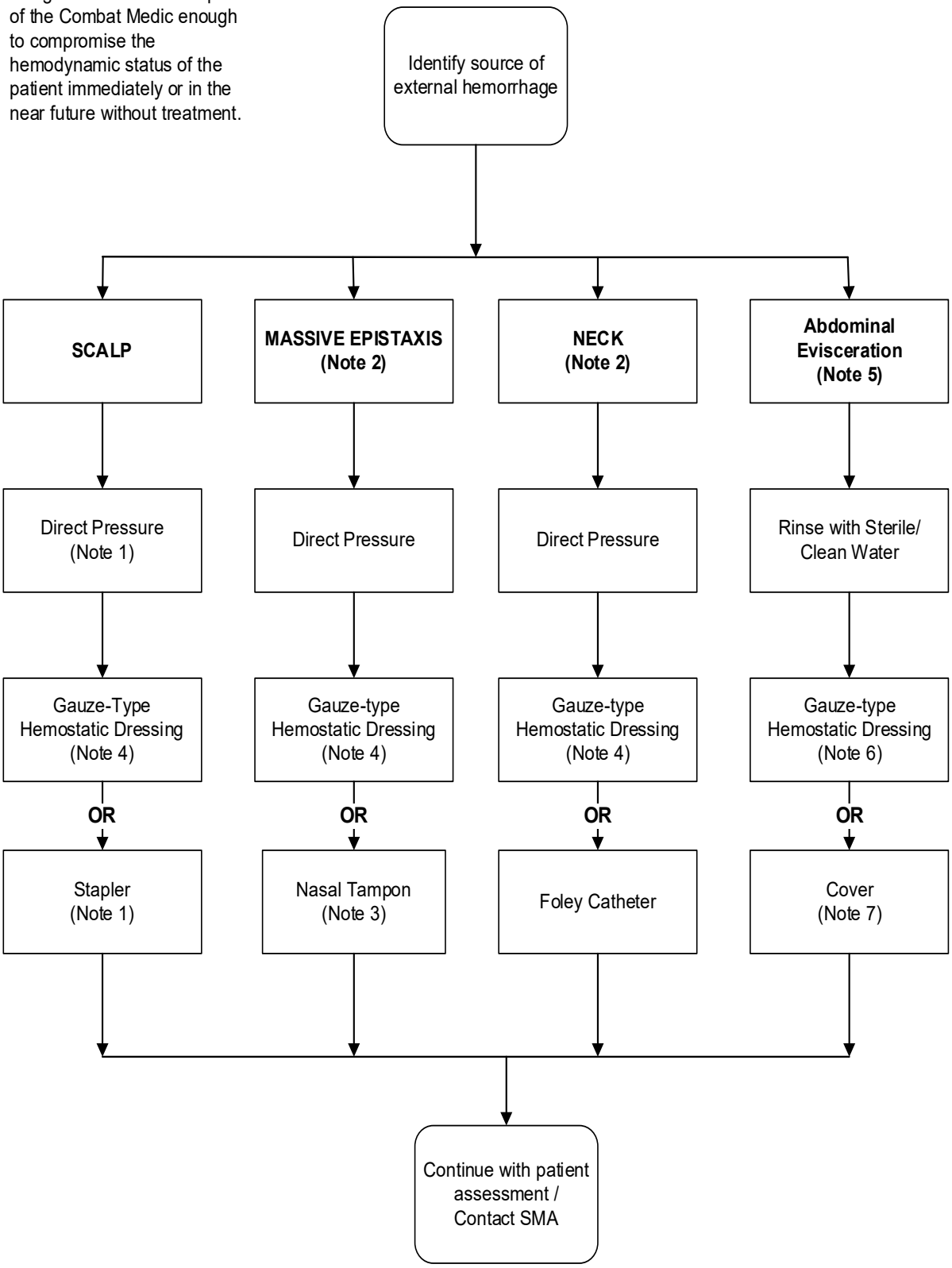
Notes*:*

1. Required to use a minimum of 18G IV/IO catheter. Blood is **ONLY** compatible with 0.9% Sodium Chloride, do **NOT** administer medications in the same IV/IO as blood.
2. Blood and/or blood products to be administered rapidly. Blood administration sets IV/IO tubing to be changed every 4 units of blood/blood product or every 4 hours.
3. The most common adverse reactions to assess for when administering blood and blood products are: Fever (≥38°C), Urticaria (hives), Dyspnea (shortness of breath) and Hypotension (SBP <100mmHg). Most reactions occur within 4 hours; dyspnea can occur up to 24 hours post transfusion. If a reaction is noted, STOP the transfusion, flush IV/IO site with IV Normal Saline and run IV/IO TKVO. Contact SMA. Document the reaction and send the blood product and line with patient to the next point of care." There are many other adverse reaction signs/symptoms, those four are the most common.
4. If patient develops a fever after blood/blood product administration (≥38°C or +1°C elevation from pre-administration temperature) and able to take medication orally, follow interventions in step 3 and administer Acetaminophen 500mg x 1 dose. Contact the SMA for further direction.
5. If patient develops anaphylaxis, stop blood transfusion, flush IV/IO with Normal Saline, (refer to Protocol 2.3 or 2.4 Anaphylaxis, contact SMA and document reaction).
6. Women of childbearing age (45 years and younger) should be given priority for O Negative (O-) blood allocation if available.
7. All efforts should be made to warm blood with fluid warmer.

3.6 Other Sources of External Hemorrhage

Indication:

- Bleeding from a wound that is of significant rate in the opinion of the Combat Medic enough to compromise the hemodynamic status of the patient immediately or in the near future without treatment.



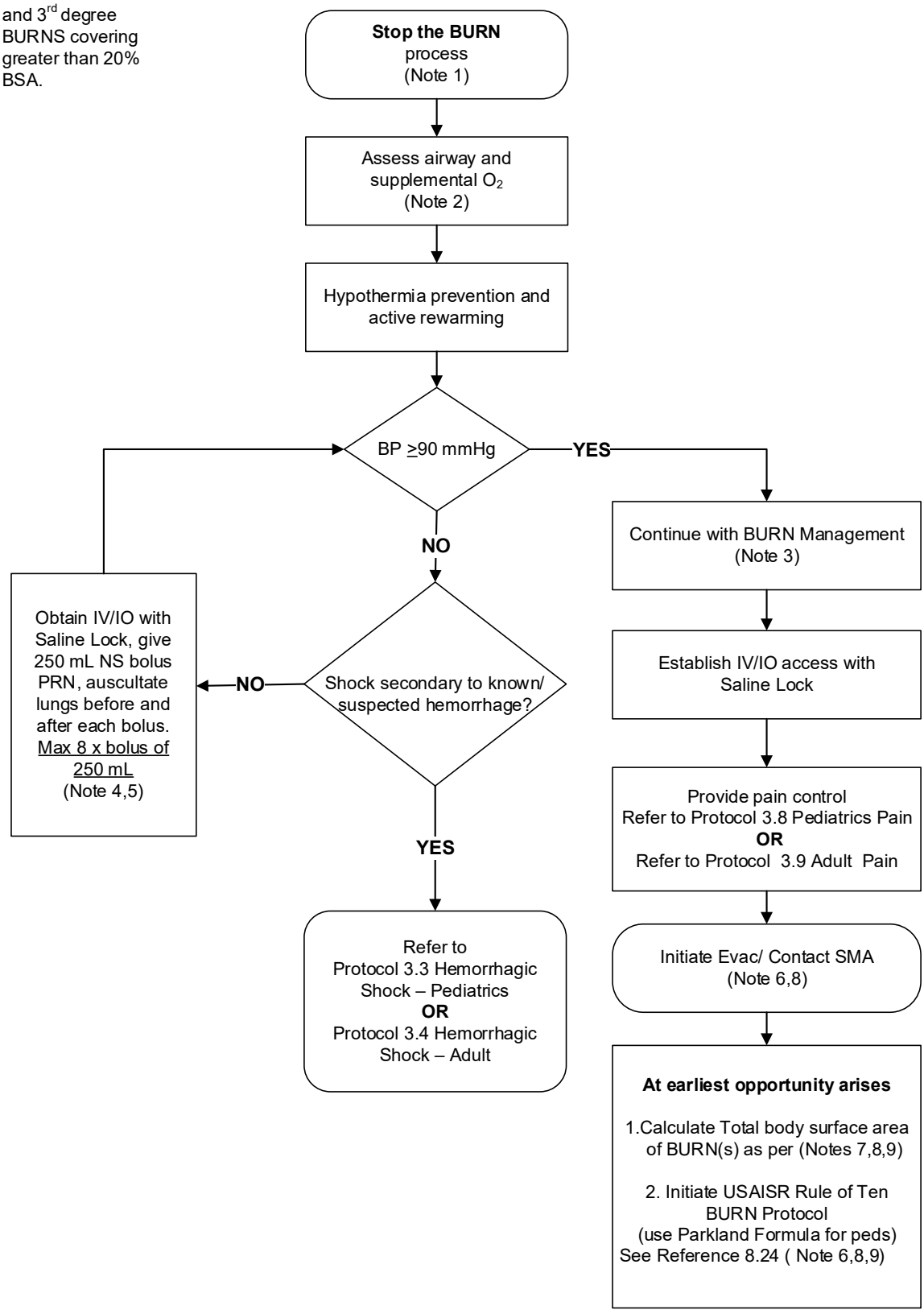
Notes*:*

1. In significant hemorrhage from scalp laceration with suspected underlying depressed skull fracture, do not pack wound or perform wound closure with sutures/staples. Attempt to control hemorrhage with dressing (not packing) avoiding excessive pressure. If evacuation is delayed/prolonged **or** experiencing difficulty managing the hemorrhage, contact SMA for guidance.
2. Airway and hemorrhage must be managed concurrently.
3. Avoid if suspected basal skull fracture or significant maxillofacial or nasal bone trauma. Severe nasal septal deviation towards bleeding side making it difficult to insert. (Reference, 8.7 Rapid Rhino Nasal Tampon or 8.8 Nasal Tampon Procedure)
4. If gauze-type hemostatic dressing not available, use plain gauze for packing and apply pressure for 10 mins.
5. For management of significant hemorrhage originating from eviscerated abdominal organs.
6. If the source of the bleed can be visualized, use gauze-type hemostatic dressing with 5 mins of finger clamping. If the source of bleed cannot be visualized, cover the area with gauze-type hemostatic dressing without pressure. **Do Not:** Reduce bleeding evisceration; or close the skin by any means; or pack the abdominal cavity.
7. Gently cover exposed bowel with a moist, sterile dressing or sterile water-impermeable covering (e.g. Saran Wrap). Prevent evaporative cooling as exposed abdominal contents will result in more rapid heat loss.

3.7 Burn Management Protocol

Indication:

- Patients with 2nd and 3rd degree BURNS covering greater than 20% BSA.



Notes:

1. Brush away caustic solids/powders and remove burned clothing prior to irrigation with copious amounts of clean water. Deal with hypothermia later.

2. Assess airway for signs/symptoms of burn (e.g.: Soot in mouth: Burns to the upper chest; Carbonaceous sputum: SOB: Stridor; Voice changes/hoarseness) and aggressively monitor any change in airway status or significant drop in blood oxygen saturation. If inhalation burn suspected, contact SMA, give high flow oxygen throughout transport and follow Protocol 2.1 Airway Algorithm. Be prepared to escalate to an emergency surgical airway, as SGAs are often ineffective with inhalation injuries where vocal cords/airway edema is common.

3. Cover burns with dry sterile dressings to help prevent hypothermia and treat pain. Cellophane wrap is effective, but do not wrap any part of the body circumferentially (to prevent compartment syndrome type of presentation). Apply loose cellophane wrap and finish wrapping with a bandage that is elastic/can stretch.

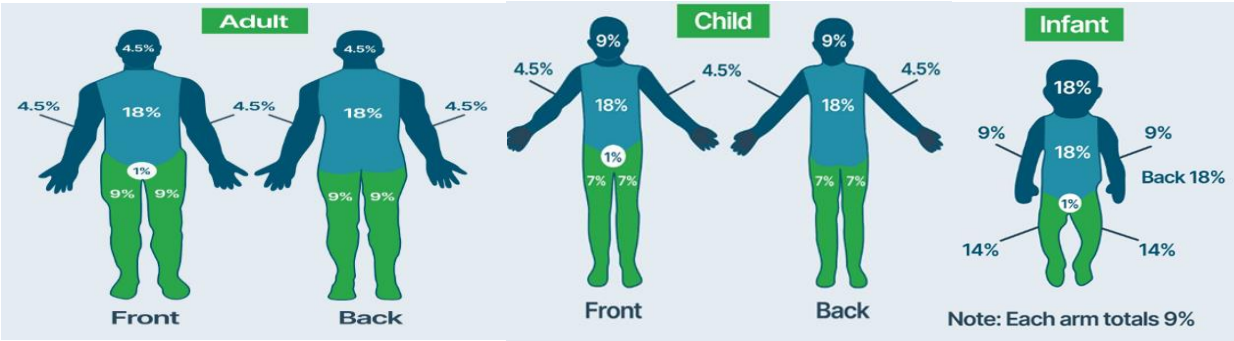
4. Auscultate the lungs before and after each bolus. Once target BP (≥ 90mmHg) is reached, initiate burn resuscitation as per Protocol. In the case of upper limb burns, IO access may need to be obtained.

5. Administer Normal Saline (NS) to a **max** of 2000 mL or until either handed over to an SMA or when there is access to Ringer Lactate solution.

6. For Holding or Prolonged Field Care: A foley catheterization is an assist skill **OR** under order from a Physician Assistant, Nursing Officer, Nurse Practitioner or Medical Officer (MO). Fluid resuscitation should be titrated to maintain urinary output (30-50mL/hr or 0.5mL/kg/hr). If urine output < 30mL/hr, increase volume by 25% for the next hour and reassess. If urine output >50mL/hr, decrease IV fluid by 25% for the next hour and reassess. (Ref 8.25 Bladder Catheterization, 8.26 Catheterization Urinary Output)

7. Antibiotics are not normally used as a prophylactic treatment in the absence of open wounds. If cellulitis develops after several days, contact SMA.

8. **Rule of Nines Body Surface Area (BSA) Estimate**



9. Do not delay evacuation to determine Total Body Surface Area of Burns or to calculate the USAIRS Rule of Ten Burn Protocol or Parkland Formula for Peds.

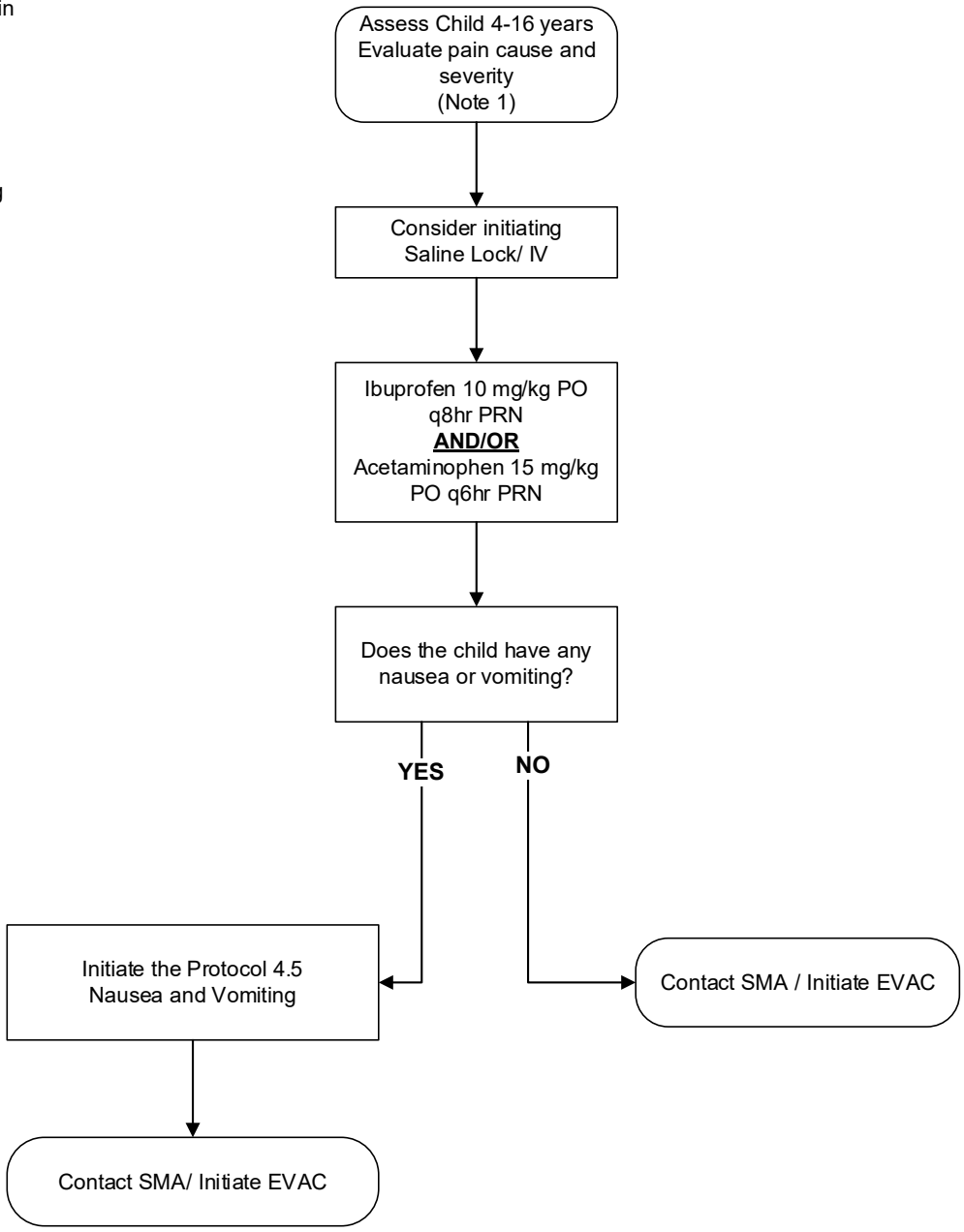
3.8 Pediatric Pain Protocol

Indication:

- Pain management in pediatric trauma patient.

Cautions:

- Severe chest injuries.
- Blunt or penetrating head trauma.



Note*:*

1. If < 4 years of age or for severe pain in the patient (4-16 years of age), contact SMA.

3.9 Adult Pain Protocol - Class B with OTFC

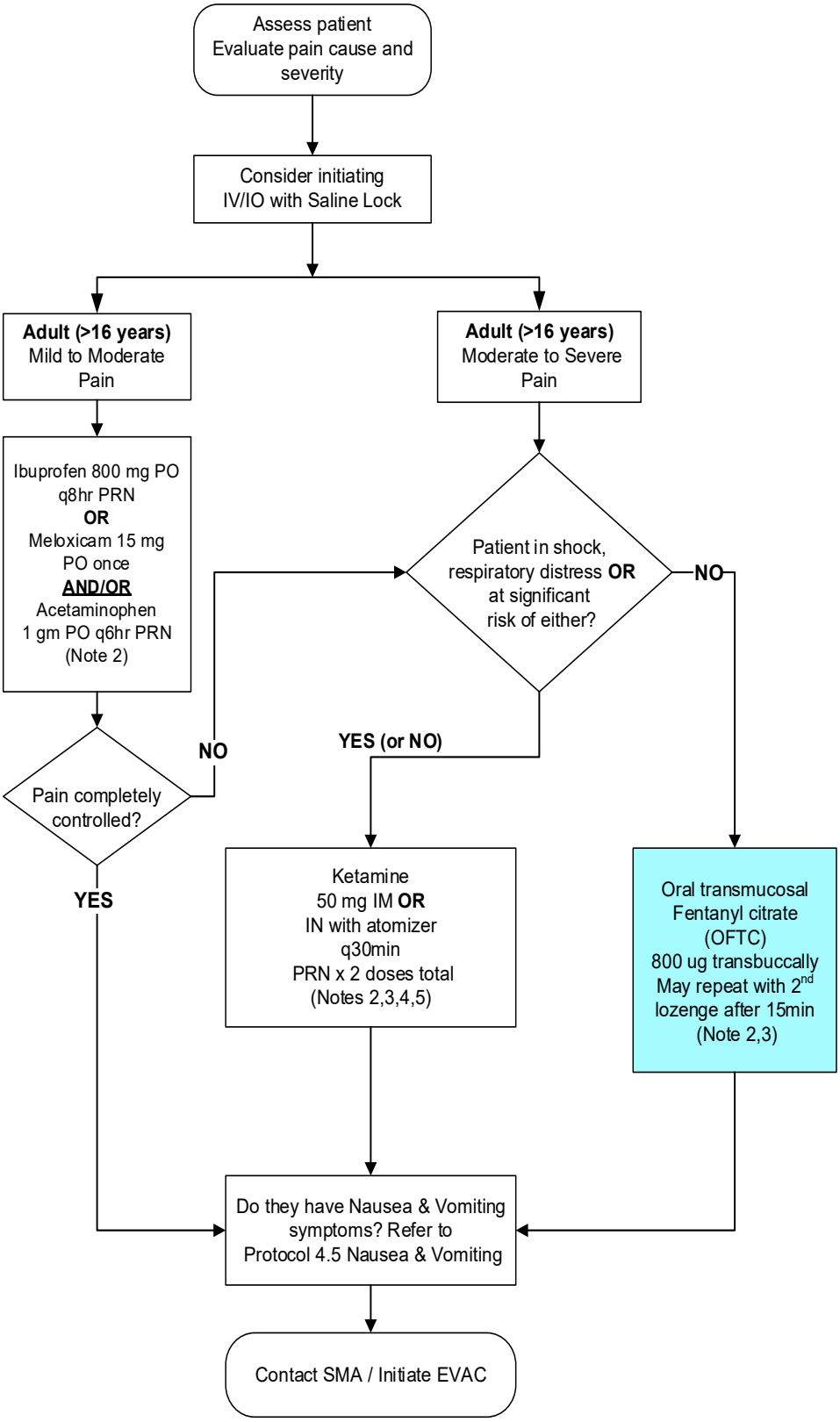
Indication:

- Management of pain in trauma patients (Note 1).

Cautions:

- Severe chest injuries.
- Blunt or penetrating head trauma

N.B:
For all patients given opioids or ketamine, closely monitor airway, breathing and circulation, reassessing frequently. If respirations are noted to be reduced after administration, provide ventilatory support with BVM.



Notes*:*

1. For pain of a non-traumatic etiology (medical pain), consult relevant protocol (e.g. Protocol 1.1 Chest Pain) or consult SMA. For management of non-acute, mild pain, refer to OTC Pain Protocol if RQ-Cpl.
2. For incomplete pain control of moderate/severe pain or where more potent meds are not indicated / available. Ibuprofen. Meloxicam or Acetaminophen can be used as an adjunct. Ibuprofen and other nonsteroidal anti-inflammatory drugs (NSAIDs) **other than** Meloxicam should be avoided in hemorrhage. Meloxicam and Acetaminophen are preferred in bleeding patients as they **DO NOT** interfere with platelet function.
3. Have Naloxone available and he prepared to assist respirations following administration. Refer to Protocol 4.1 - Narcotic Overdose
4. Endpoint: Pain control or nystagmus. Ketamine may be added to patients who have received opiates with incomplete pain control. Monitor for increased secretions or transient laryngospasm and be prepared to reposition airway, suction, or use BVM.
5. For Ketamine preparation, and administration (including IN), refer to Reference 8.20 Pain Management

1	2	3	4	5	6	7	8	9	10
Mild to Moderate Pain			**Moderately strong**			**Severe Pain**			
Sometimes mild pain is noticeable and distracting, however, you can get used to it and adapt.			Moderately strong pain may interfere with normal activities. It could be difficult to concentrate. You can't ignore the pain for more than a few minutes.			**Severe** pain dominates your senses and significantly limits your ability to perform normal daily activities or maintain social relationships. Interferes with sleep.			

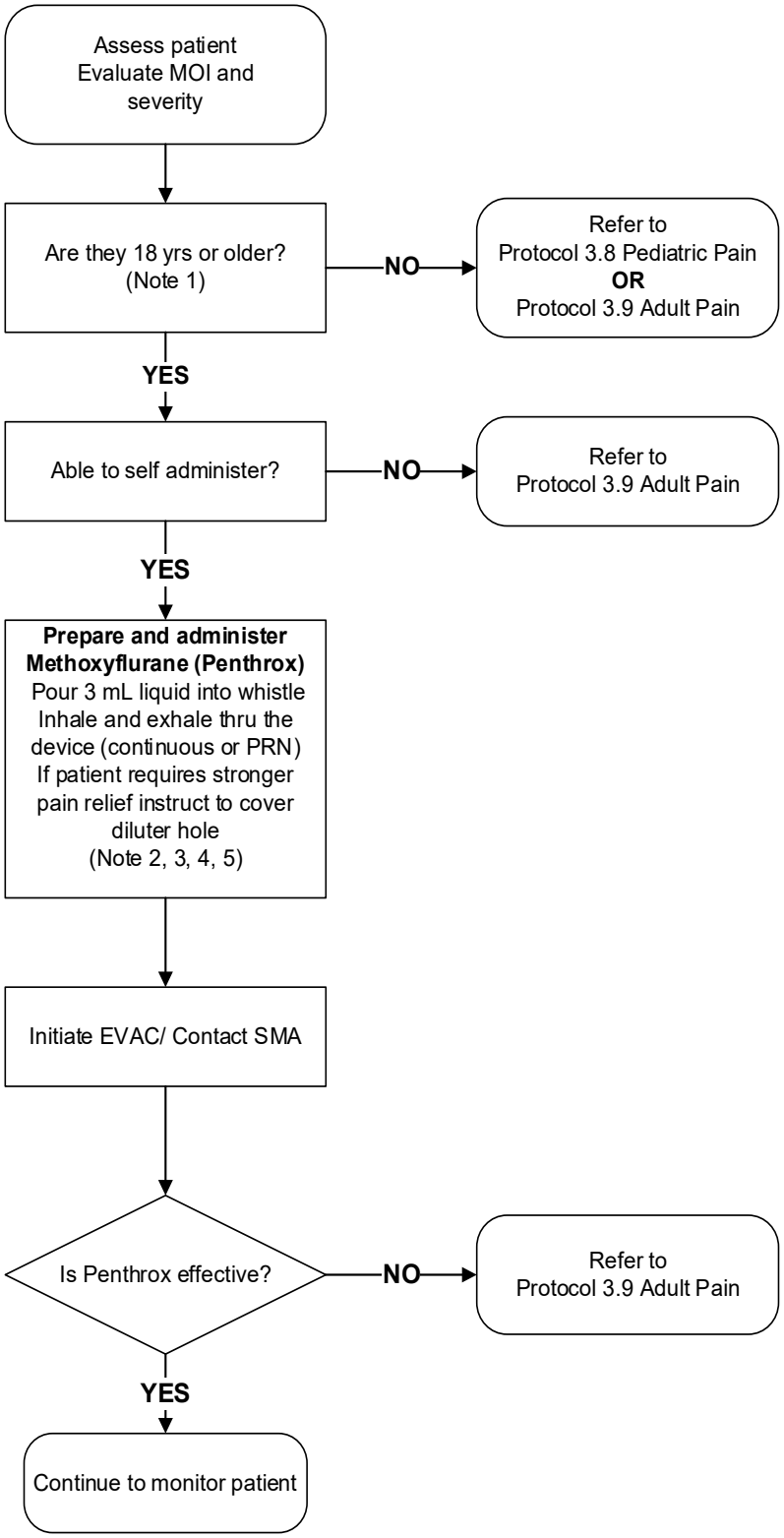
3.10 Penthrox Pain Protocol

Indications:

- Moderate to severe acute pain in a conscious patient and can be self administer.
- Movement of casualty **OR** application of devices

Contraindications:

- <18 yrs old
- Hypersensitivity to anaesthetic drugs
- Pregnancy or giving birth or lactating
- Unable to self administer
- Patient in shock **OR** respiratory distress **OR** at significant risk of either.
- Patient has to drive within the next 24hrs.



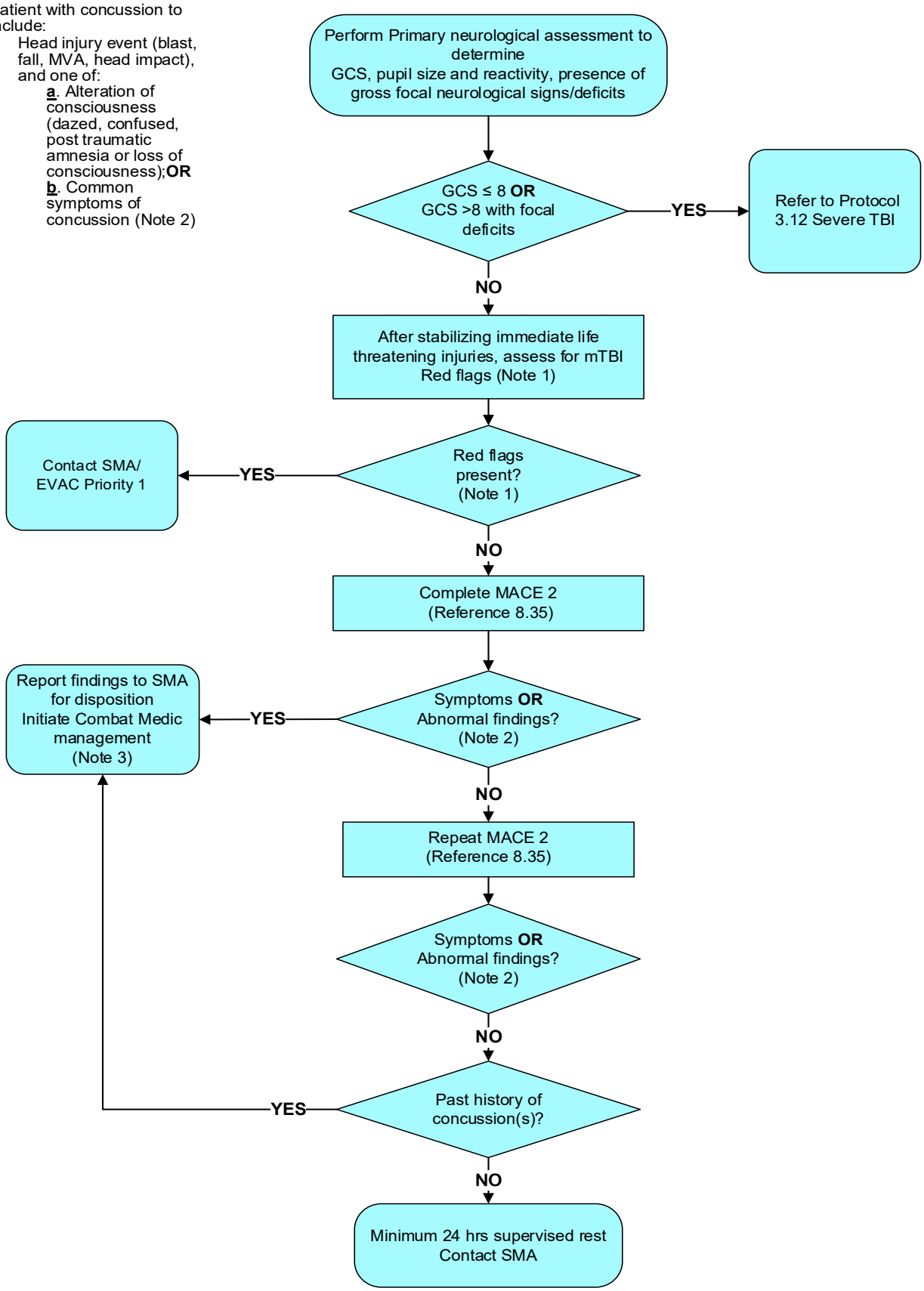
Notes*:*

1. As per Health Canada, Penthrox may only be used for patients 18 yrs and older.
2. Patient must be able to inhale and exhale thru the device. Device is a secured wristlet around patient's wrist.
3. Only allowed 2 doses (2 devices) in 48hrs., one device can last between 20-60 min. Not to be given to a pregnant woman or patients who are known to be or genetically susceptible to malignant hyperthermia. (see drug monograph).
4. Penthrox should be used when there are no contraindications for medical procedures (e.g. the application of CT-6) **or** for short-term patient movement, this medication is not for long term pain relief.
5. If patient must drive within the next 24hrs after receiving Penthrox, should not receive the medication.

3.11 Concussion (mTBI) Management- Class B

Indication:
Patient with concussion to include:

- Head injury event (blast, fall, MVA, head impact), and one of:
  - **a**. Alteration of consciousness (dazed, confused, post traumatic amnesia or loss of consciousness);**OR**
  - **b**. Common symptoms of concussion (Note 2)



3.11 Concussion (mTBI) Management- Class B (cont.)

Notes*:*

1. Red flags for mTBI Concussion:
    a. ANY loss of consciousness
    b. Severe/worsening headache
    c. GCS <15
    d. Seizure(s) with current event
    e. Repeated vomiting
    f. Declining neurological status
    g. Signs/Symptoms of basilar skull fracture: Hemotympanum; Racoon eyes; Battle signs; Otorrhea; Rhinorrhea
    h. Pupil asymmetry
    i. Abnormal speech
    j. Double vision
    k. Weakness/numbness in arms, legs or face
    l. Any post traumatic amnesia
    m. Unusual behavior
2. Common Symptoms of Concussion:
    a. Headache
    b. Irritability
    c. Sleep Disturbance
    d. Fatigue
    e. Difficulty concentrating
    f. Dizziness
    g. Photo/Phonophobia
    h. Combat Medic Management
3. Headache management as per Pain Protocol 3.8 Pediatric or 3.9 Adult
    a. Hydration
    b. Rest (Reduce Stimulus)
    c. Reassess every 6hr. for a minimum of 24hrs.
    d. Provide regular updates to SMA

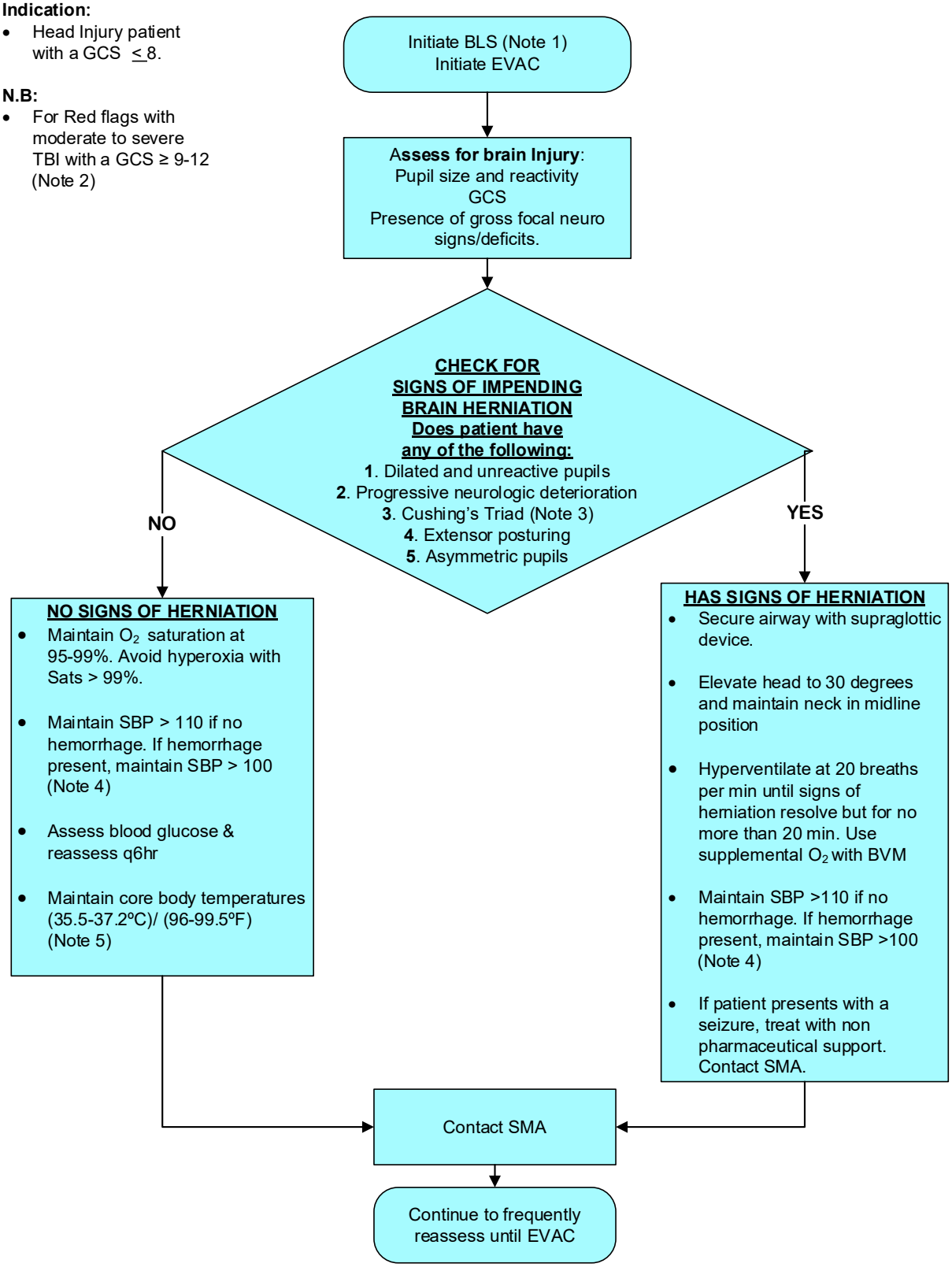
3.12 Severe TBI Protocol – Class B

Indication:

- Head Injury patient with a GCS ≤ 8.

N.B:

- For Red flags with moderate to severe TBI with a GCS ≥ 9-12 (Note 2)



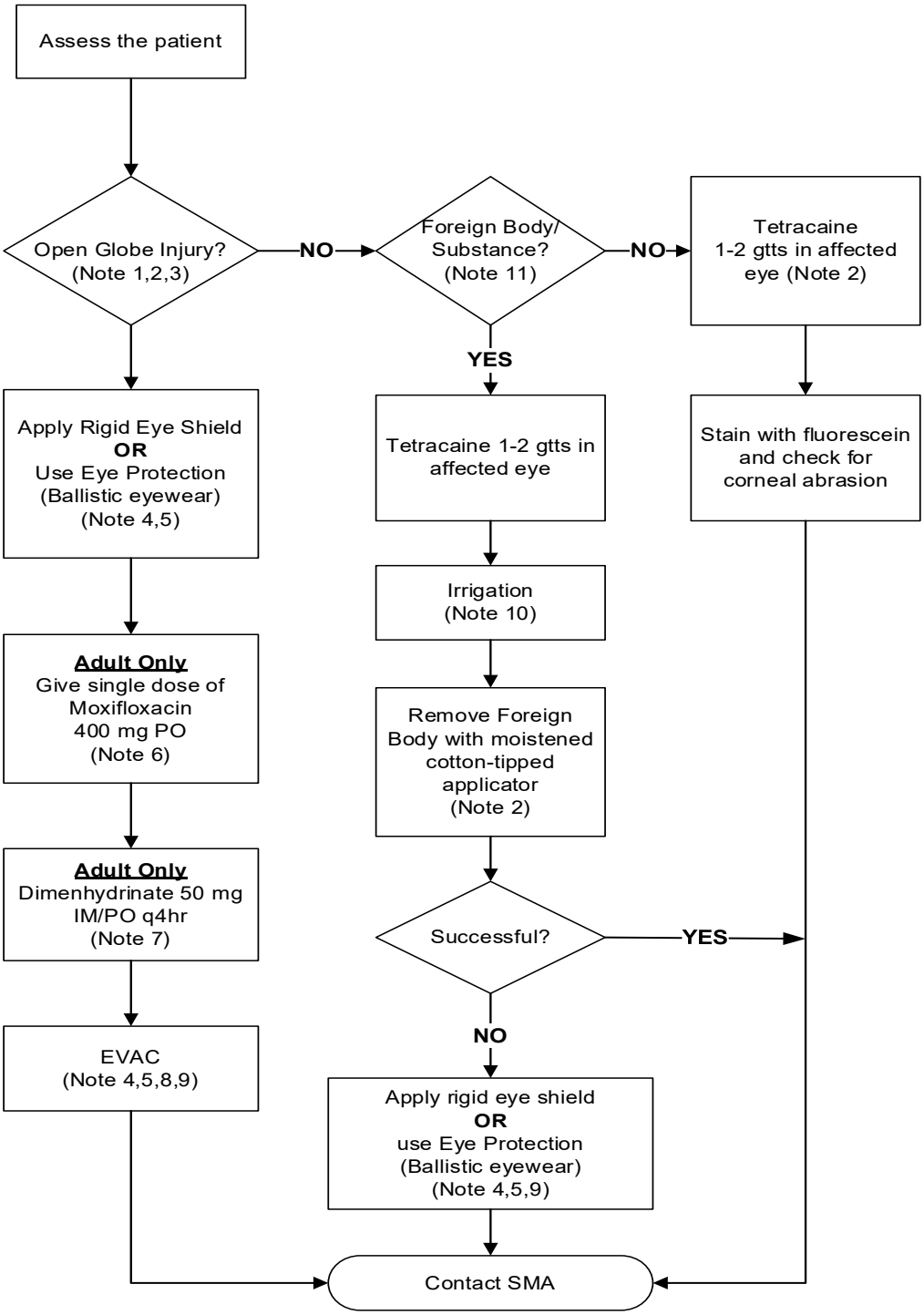
Notes*:*

1. C-collar and C-spine precautions need to be considered early. Ensure C-collar does not compress the jugular veins in the neck (could worsen ICP).
2. Red flags with moderate to severe TBI with a GCS ≤ 12: Witnessed loss of consciousness; Two or more blasts exposures within 72hrs; Unusual behavior or combativeness; Double vision or loss of vision; Weakness on one side of the body; Cannot recognize people or disoriented to place; Worsening headache; Unequal pupils; Seizure; Abnormal speech; Repeated vomiting.
3. Cushing's triad (increase systolic pressure (widening pulse pressure); Bradycardia; Irregular respirations) is a physiologic response that can occur with elevated ICP, resulting in medullary compression. While a late finding, it should be viewed as a sign of cerebral herniation.
4. Target SBP without hemorrhage is > 110 (bolus of 250mL NS PRN x 4 max, goal is to maintain SPB > 110). If known or suspected hemorrhage, target SBP is > 100 (bolus of 250mL NS PRN x 4 max, goal is to maintain SPB > 100). **Avoid Ringer's Lactate** as it can exacerbate brain swelling.
5. Hypothermia is part of The Lethal Diamond and should be avoided in multitrauma (refer to Protocol 5.1 Hypothermia). Hyperthermia will increase cerebral metabolism and may increase ICP (refer to Protocol 5.2 Hyperthermia for cooling methods).

3.13 Eye Injury Protocol

Indications:

- Eye injury or eye pain



Notes*:*

1. There are 2 mechanisms for an open-globe injury:
    a. Laceration from penetrating or perforating trauma;
    b. Ruptured globe from blunt trauma (e.g. Collapsed or severely distorted eye: Open wound. full- thickness corneal or scleral laceration: Prolapse of intraocular contents outside the eye [Dark tissues are iris or uveal tissues]: Peaked or irregular pupil; Shallow anterior chamber).
2. Assess and document visual acuity when possible. Remove contact lens if present.
3. Reference 8.19 Eye Trauma Principles and Management below.
4. Elevate the head 30 degrees if possible.
5. Avoid maneuvers that increase intraocular pressure (No Valsalva maneuver or nose blowing).
6. If unable to tolerate oral medication or allergic to Moxifloxacin, refer to Protocol 4.2 Antibiotic.
7. Treat nausea and vomiting aggressively with Dimenhydrinate.
8. Evacuation for urgent surgical repair within 4hrs. (evac vs triage).
9. Nothing to eat or drink.
10. For chemical injury, irrigate immediately and with copious amount water or follow the MSDs sheet if available, remove contact lens and contact SMA. Direct patient to not rub eyes. **DO NOT** flush the eyes if it is suspected of ruptured globe injury.
11. Contraindications for foreign body removal: hyphema, penetrating objects, corneal lacerations, defects, or patients' ability to comply.

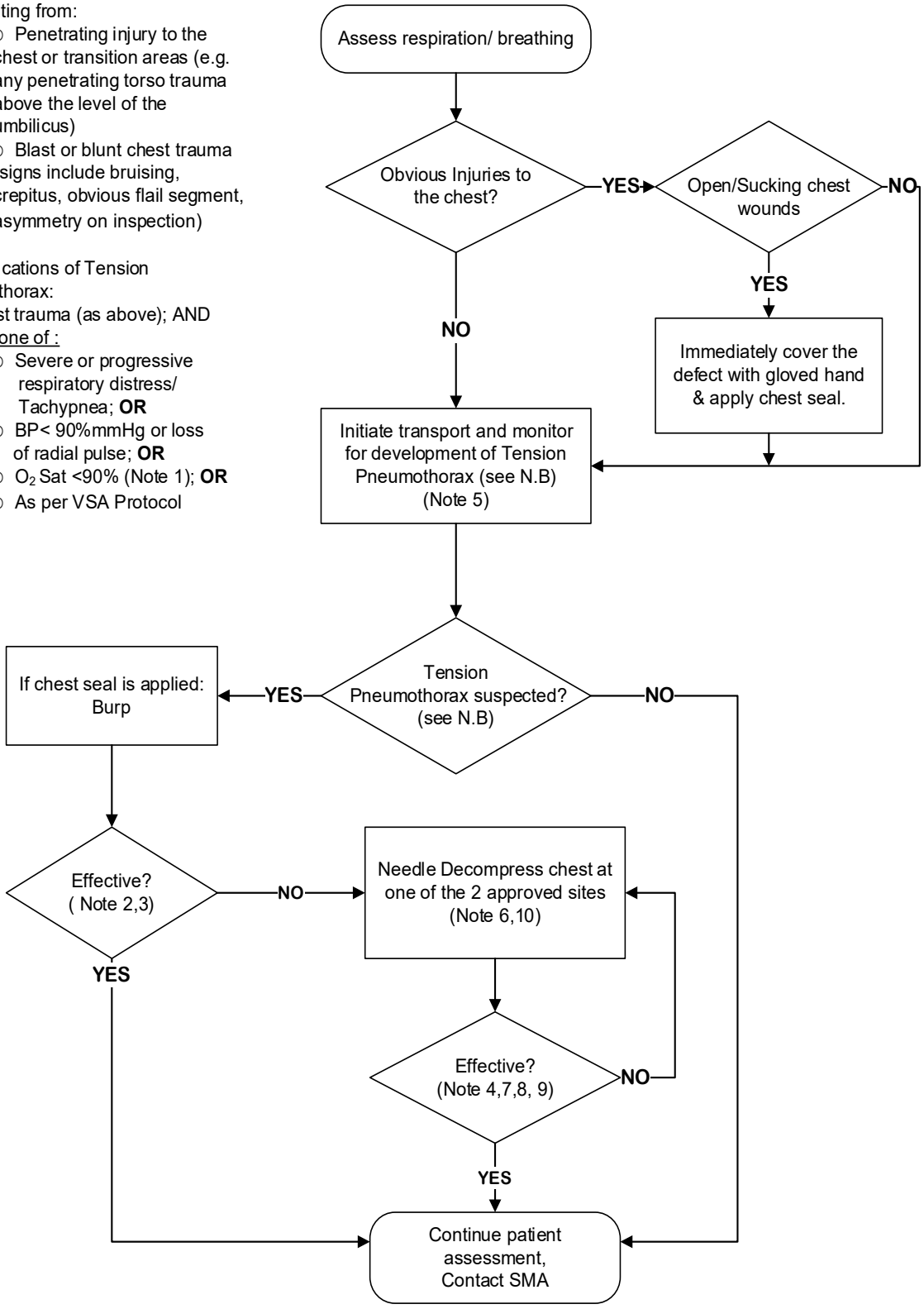
3.14 Chest Trauma Management

Indications:

- Known or suspected injury to the chest or underlying structures resulting from:
  - Penetrating injury to the chest or transition areas (e.g. any penetrating torso trauma above the level of the umbilicus)
  - Blast or blunt chest trauma (signs include bruising, crepitus, obvious flail segment, asymmetry on inspection)

N.B. Indications of Tension Pneumothorax:

- Chest trauma (as above); AND
- Any one of :
  - Severe or progressive respiratory distress/ Tachypnea; **OR**
  - BP< 90%mmHg or loss of radial pulse; **OR**
  - O_2 Sat <90% (Note 1); **OR**
  - As per VSA Protocol

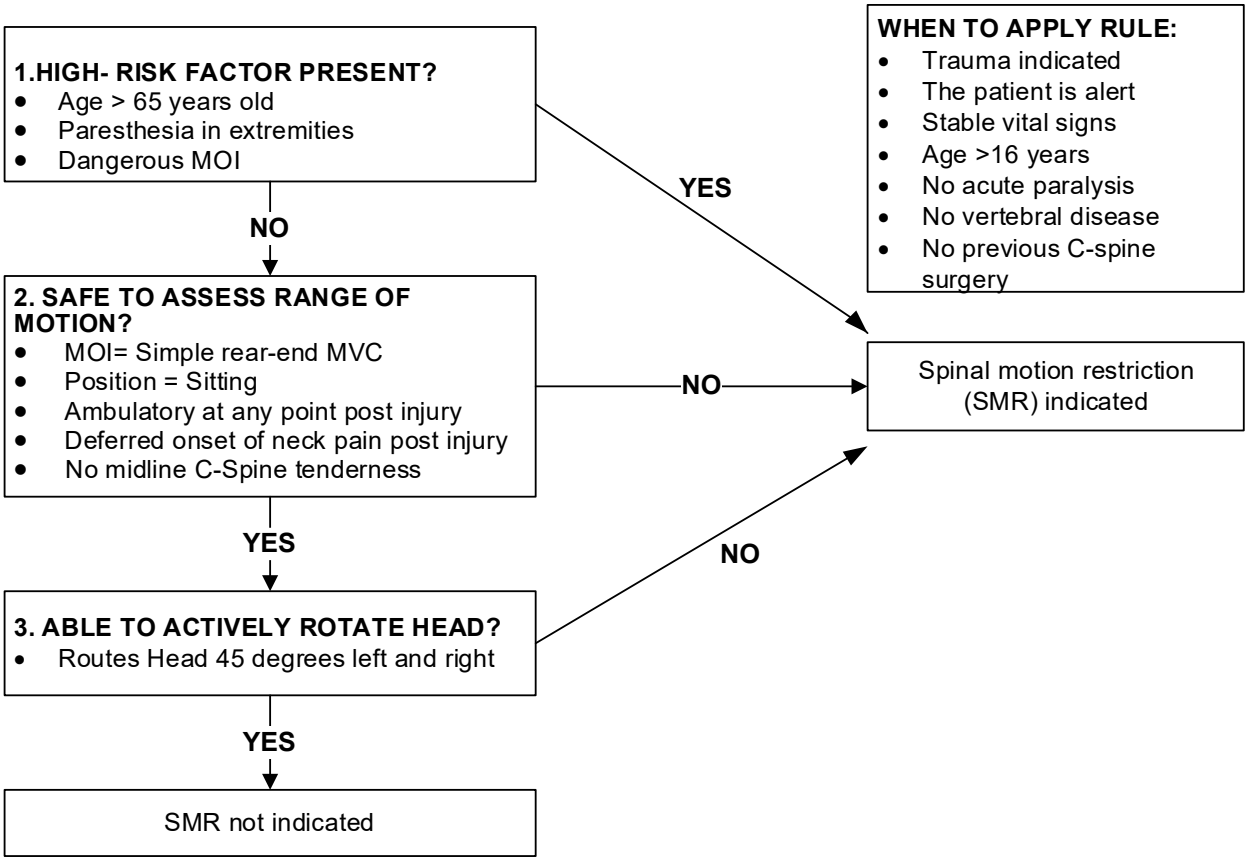


Notes*:*

1. Hypoxia alone is not an accurate indicator of tension pneumothorax. The Combat Medic should consider other causes of hypoxia that do not necessitate needle decompression (ND). These include chest wall defects (e.g. flail chest) and/or injuries (pulmonary contusion) to the chest that cause pain or mechanically interfere with proper ventilation.
2. Allow 2 attempts at Burping before changing to Needle Decompression (ND).
3. Burping can be repeated as many times as necessary, as long as it's effective. (Reference 8.17 Burping Procedure)
4. Indications of a successful/effective decompression (ND), (Reference 8.18 Needle Decompression)
5. **Simple pneumothorax (SPX)** is defined as gas in the pleural space with limited impact on respiratory and circulatory physiology.

   Tension pneumothorax (TPX) is defined as an increasing volume of gas under pressure in the pleural space causing worsening respiratory or circulatory physiology which may be fatal if left untreated.
6. The 2 approved sites: Anterior Site (2nd intercostal space midclavicular) and lateral site (4^{th} or 5^{th} intercostal space anterior axillary line). (Reference 8.18 Needle Decompression)
7. If the first ND attempt is not successful, perform a second ND on the same side of the chest, at whichever of the two recommended sites was not previously used. If 2 consecutive NDs have resulted in no clinical improvement, the casualty's presentation may be due to hemorrhagic shock or other conditions, and provider should continue with assessment of circulation.
8. If an ND is removed from a site, the ND should be clearly marked with a circle with a cross through and the letters ND, as well as documented on a casualty card.
9. If Tension Pneumothorax redevelops, repeat the ND procedure at same site but laterally/posteriorly as applicable.
10. Do not delay the ND with application of O_2, but if already in place, onflow may be reduced to maintain Sat 92%.

3.15 Canadian C-Spine Rule



Note:

If tactically feasible.

Section 4

MEDICAL

Protocol	Name	Page
4.1	Narcotic Overdose (Adult)	**62**
4.2	Antibiotic Protocol- **Class B**	**64**
4.3	Hostile/Violent Patient	**66**
4.4	Hypoglycemia Protocol	**68**
4.5	Nausea & Vomiting Protocol	**70**
4.6	Unconscious NYD	**72**
4.7	Seizure Protocol	**73**

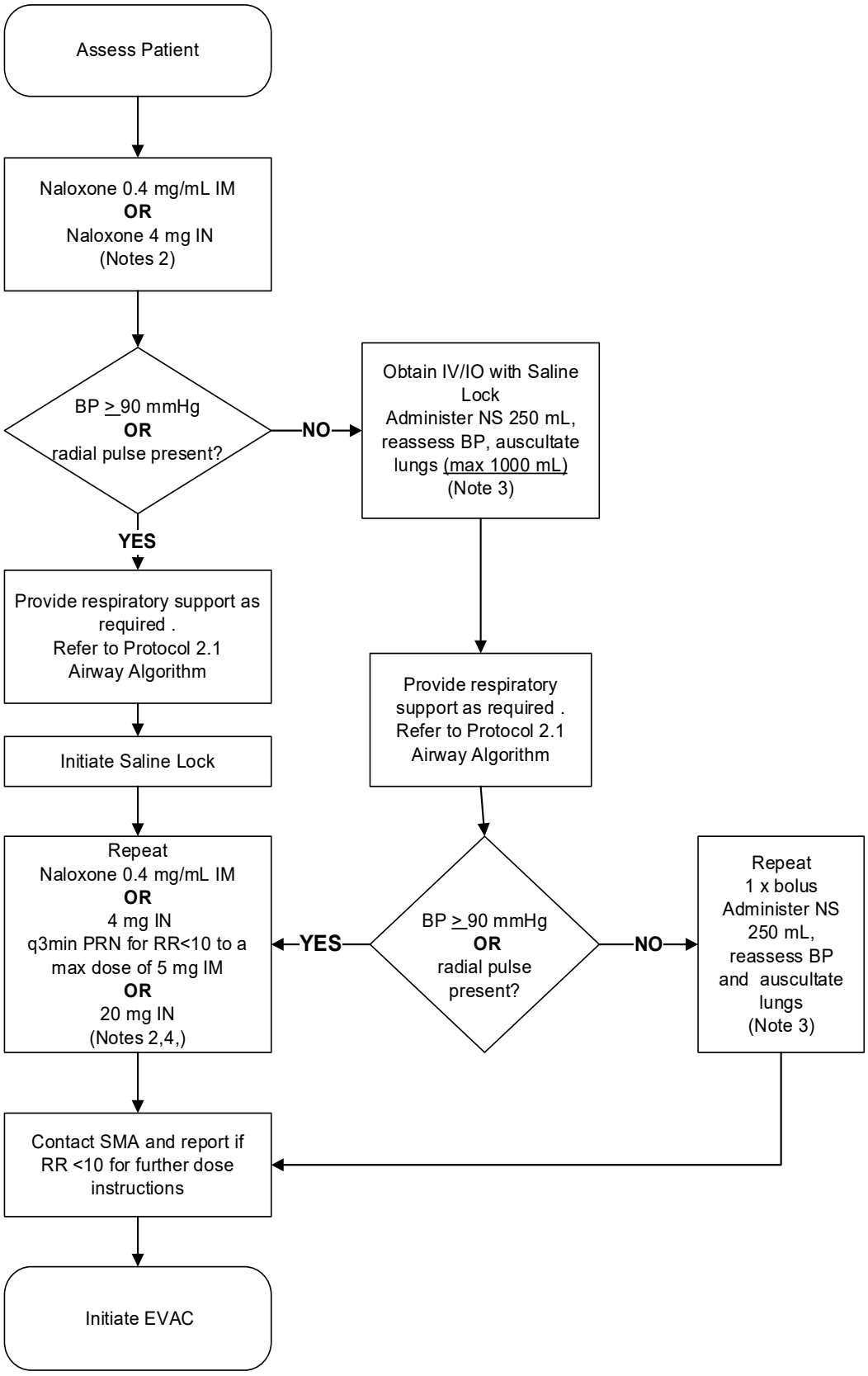
4.1 Narcotic Overdose – Adult (Suspected)

Indication:

- Decreased LOC in an adult with a history that suggests narcotic overdose and a respiratory rate of less than 10 per minute. Pinpoint pupils are often a sign of narcotic. (Note 1)

Precautions:

- Watch for acute withdrawal in narcotic dependent patients.
- If indicated consider Protocol Hostile Violent
- Contact SMA if it the patient is a child or having a seizure



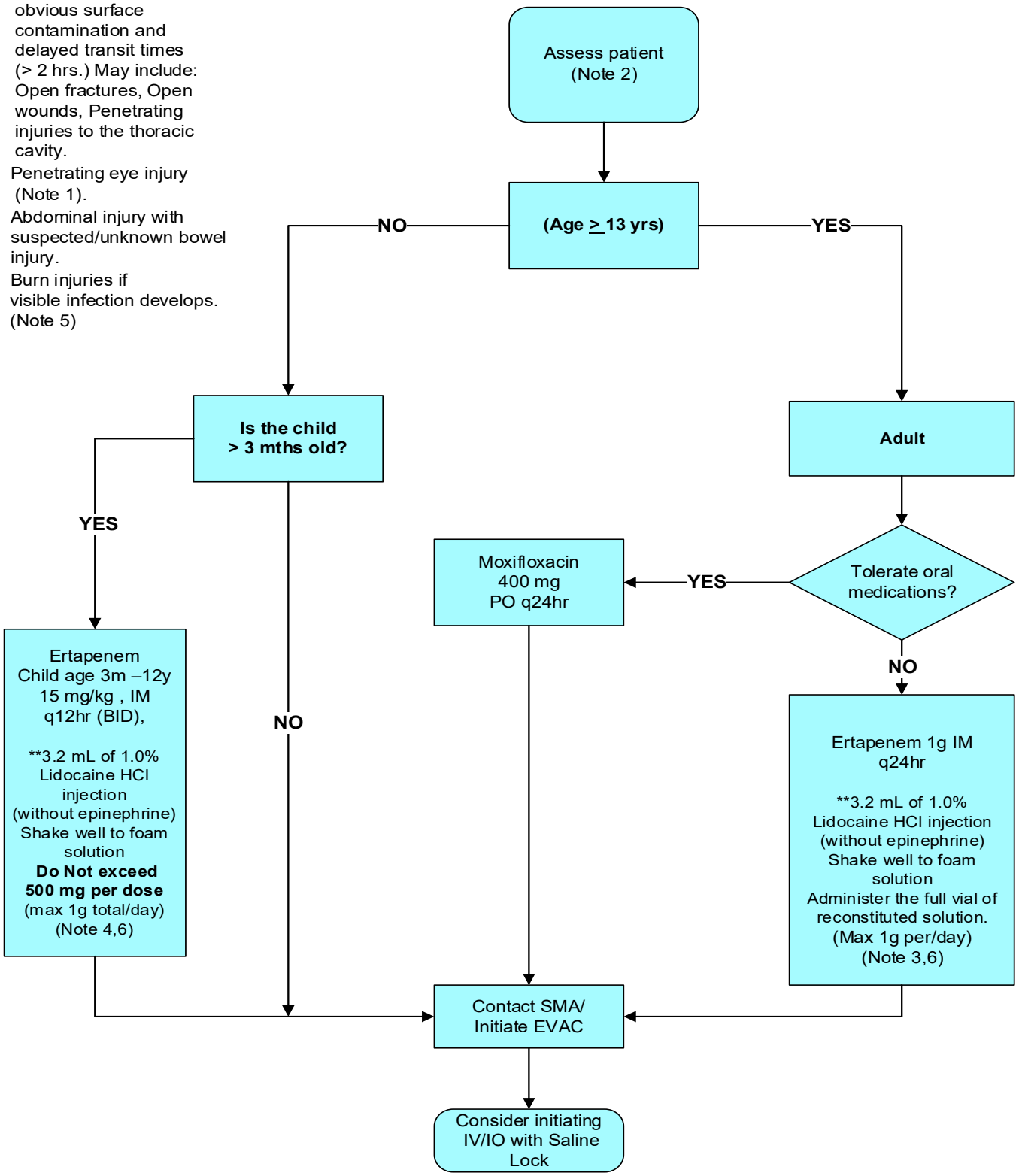
Notes*:*

1. Narcotic medications include (but are not limited to): Codeine: Fentanyl: Hydrocodone: Hydromorphone: Methadone: Morphine: Oxycodone: Oxymorphone: Meperidine and their base opioids.
2. Administer Naloxone with the intent of restoring adequate ventilation RR > 10 and SpO_2 > 92%.
3. Be aware of administering large amounts of fluids in elderly or frail.
4. While managing hypotension, pt may also require repeated Naloxone 0.4 mg IM or 4 mg IN, q3min to a max of 5 mg IM or 20mg IN. Contact SMA early and before further dosing.

4.2 Antibiotic Protocol – Class B

Indications:

- Open wounds with obvious surface contamination and delayed transit times (> 2 hrs.) May include: Open fractures, Open wounds, Penetrating injuries to the thoracic cavity.
- Penetrating eye injury (Note 1).
- Abdominal injury with suspected/unknown bowel injury.
- Burn injuries if visible infection develops. (Note 5)



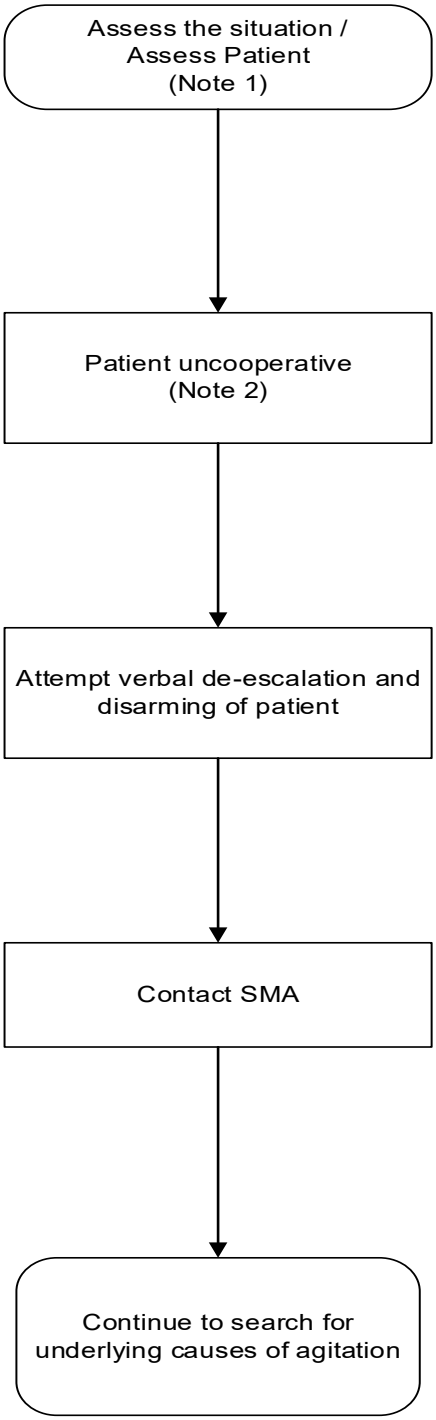
Notes*:*

1. Antibiotics should be given ASAP and ideally within 60min of penetrating eye injury.
2. Where tactically feasible cleanse wound with copious irrigation (Normal Saline) and apply dry, sterile dressing. If Normal Saline is not available, clean water can be used. Avoid hypothermia. Do not irrigate an eye injury until a ruptured globe has been excluded as a diagnosis.
3. Ertapenem IM administration, when required should be in a large muscle, the preferred site is vastus lateralis (thigh). Reconstituted IM solution must be used within 1hr of preparation. Only reconstitute with 1% Lidocaine **without** Epinephrine.
4. Ertapenem IM administration in a pediatric patient, when required should be in a large muscle, the preferred site is vastus lateralis (thigh). Reconstituted IM solution must be used within 1hr of preparation. Only reconstitute with 1% Lidocaine **without** Epinephrine. Any reconstituted IM solution left over from pediatric dose after the administration should be discarded.
5. Prophylactic antibiotics are not indicated for burn injury in the absence of infection. If cellulitis or invasive burn wound Infection develop in a prolonged field care setting, contact SMA.
6. The recommended site for intramuscular (IM) administration of Ertapenem is the vastus lateralis muscle (thigh). If the thigh is not a viable option, the secondary approach is to divide the dose and administer half into each deltoid muscle (upper arms). If neither site is suitable for injection, contact the SMA for further direction.

4.3 Hostile / Violent Patient Protocol

Indication:

- Uncontrollable adult patient threatening to harm themselves, others or otherwise jeopardizing safety.



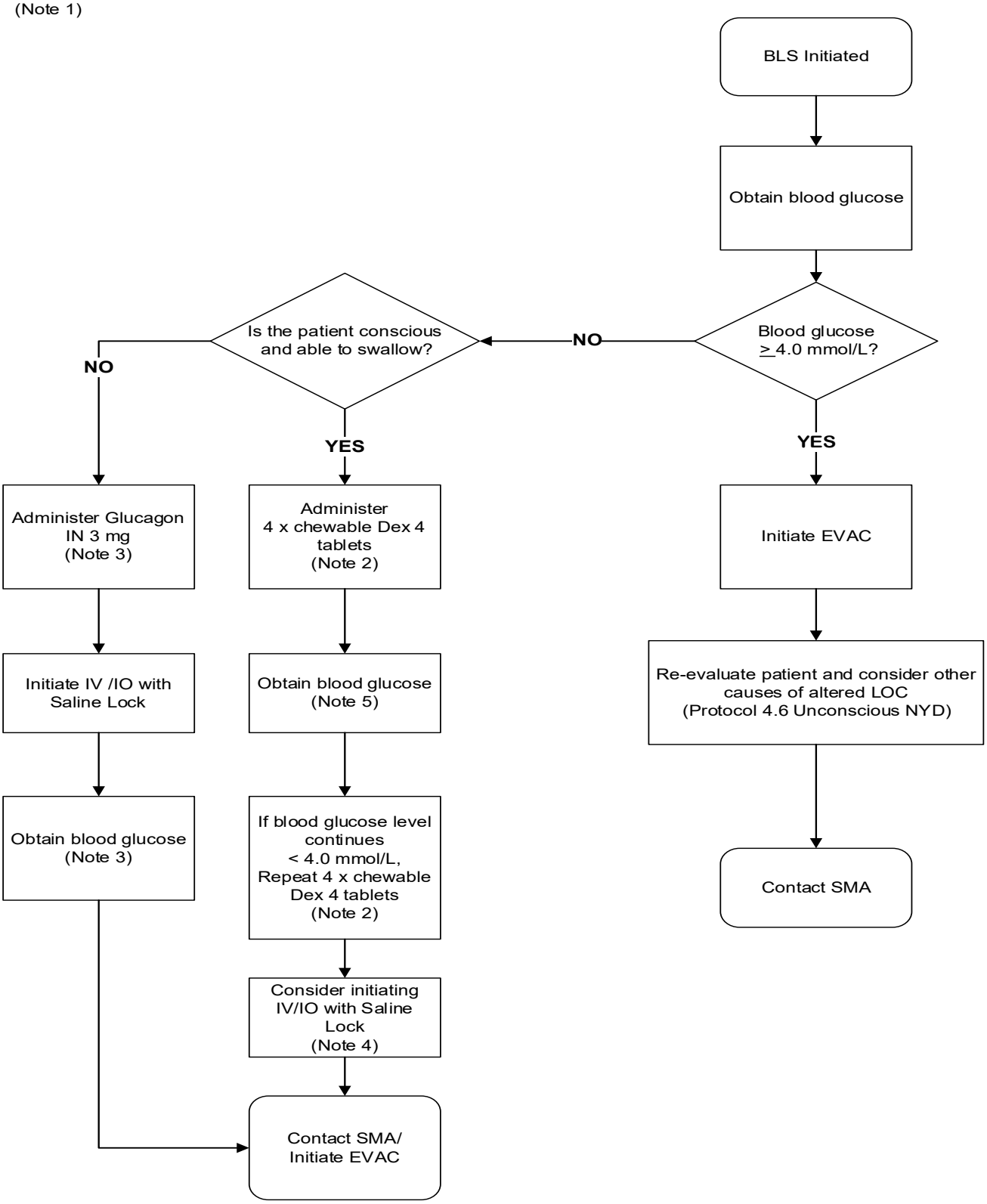
Notes:

1. Assess for medical causes of agitation including. Hypoglycemia, Hypoxia; Drug overdose/poisoning; Infection, Intracranial lesion; or unknown cause. If patient will allow.
2. Agitation or uncooperativeness alone is not grounds for medical intervention. The need to intervene should be evaluated and given appropriate consideration of the situation, the patient's need for care and the degree of risk / threat presented. The provider's safety is a priority. Any attempt at de-escalation and disarming should utilize appropriate/available resources (e.g. Military Police).

4.4 Hypoglycemia Protocol

Indication:

- Blood Glucose level (less than) < 4.0 mmol/L. (Note 1)



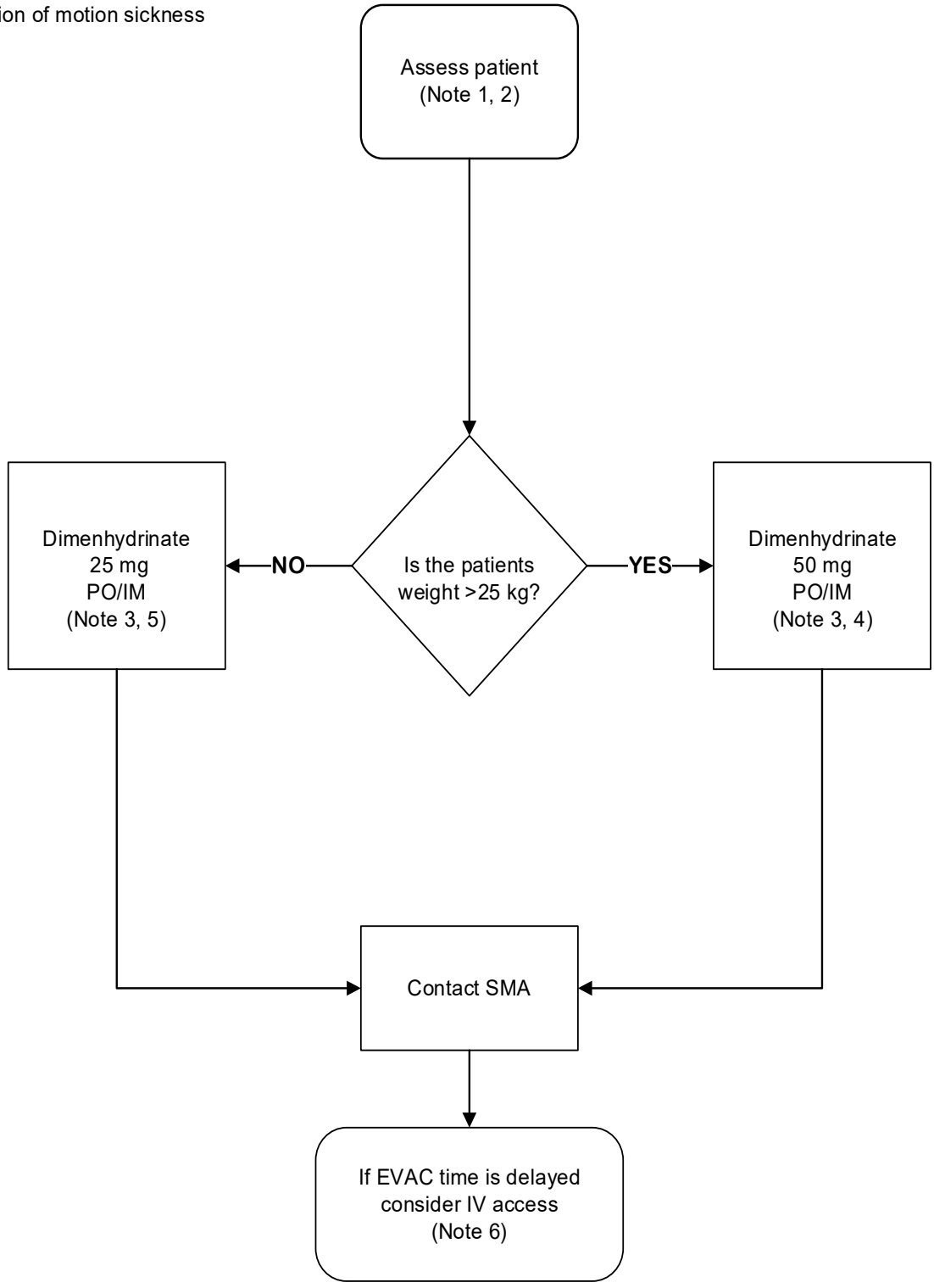
Notes*:*

1. If under 10 years old, contact SMA.
2. **Do not** administer to an unconscious patient or patient that is unable to swallow.
3. Give Glucagon (***Baqsimi*** ^{TM}) intranasal (IN) in both adults and children. May repeat Glucagon with a 2nd dose of 3 mg intranasal after 15 mins if inadequate response (unconscious) and blood glucose level remains < 4.0 mmol. When a patient responds (ex. able to follow commands, swallow and doesn't require a protected airway), administer oral carbohydrates (e.g. Glucose tablets, 1 x dose) to restore liver glycogen to prevent secondary hypoglycemia. If there is no improvement or if the patient continues to decompensation, contact the SMA.
4. If able to administer Dex 4 tablets initially, perform second blood glucose level after 15 mins, if level continues to be < 4.0 mml/L repeat another 4 x Dex-4 tablets, contact SMA and consider IV/IO with saline lock if patient is continuing to display hypoglycemic symptoms.
5. Obtain blood glucose after 15 mins for adults and children.

4.5 Nausea & Vomiting Protocol

Indications:

- Nausea & Vomiting
- Prevention of motion sickness



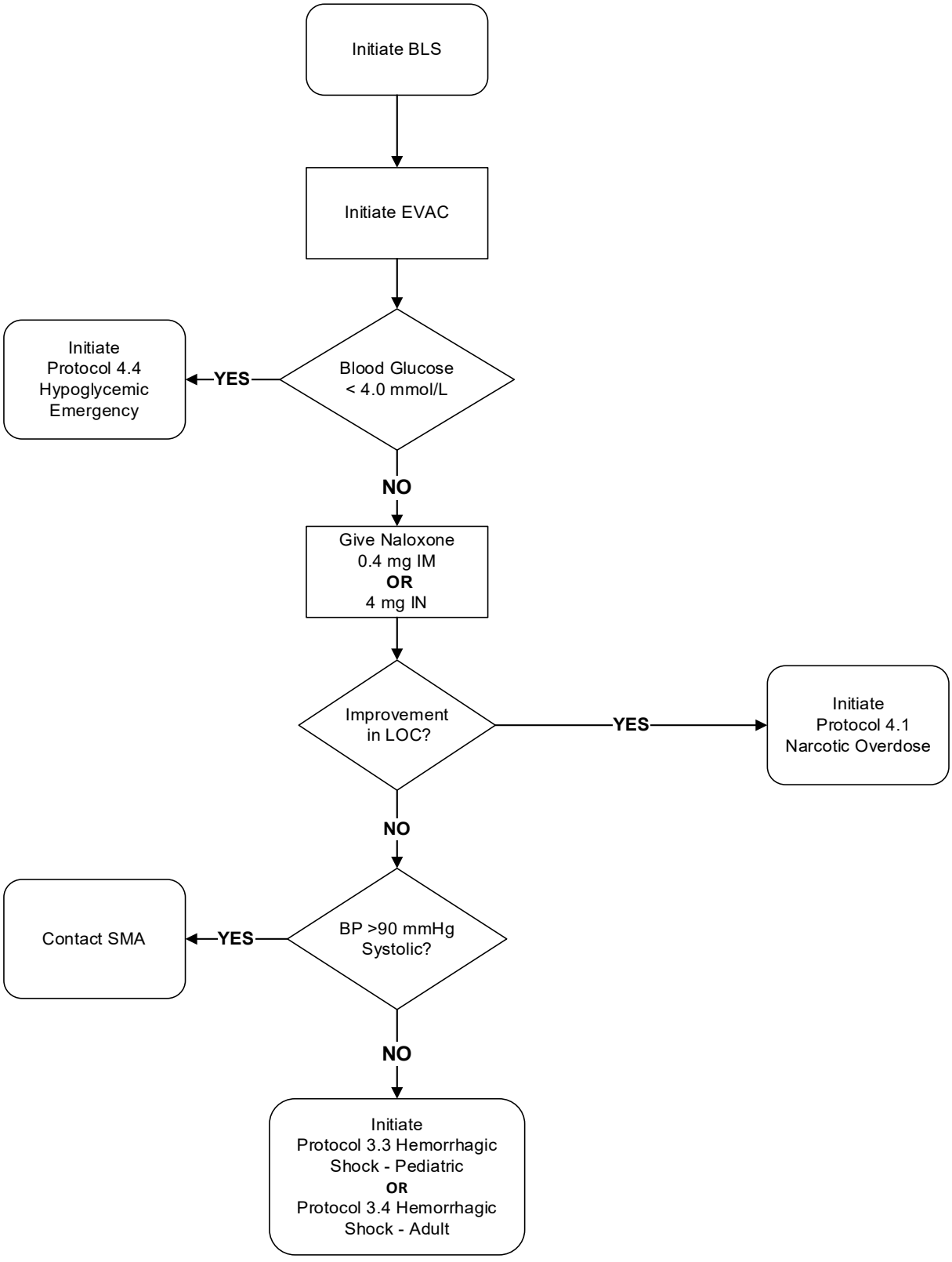
Notes*:*

1. Assess patients' vitals, skin turgor, ask about hydration, urine color and output.
2. Consider the alcohol pad sniff test trialed (non-pregnant) prior to giving Dimenhydrinate, there is some evidence that it helps relieve nausea.
3. Dose can be repeated after 4-6hrs. if necessary.
4. For patients >60 yrs consider using half dose (25 mg) initially.
5. Pediatric dose 12.5 mg if 15 kg or under (average 2 yrs old is ~15 kg) pediatric patients under 2 yrs old contact physician.
6. If EVAC is delayed, initiate IV Normal Saline with Saline Lock, 20 mg/kg, reassess every 250 mL (max 1000 mL Normal Saline).

4.6 Unconscious NYD Protocol

Indication:

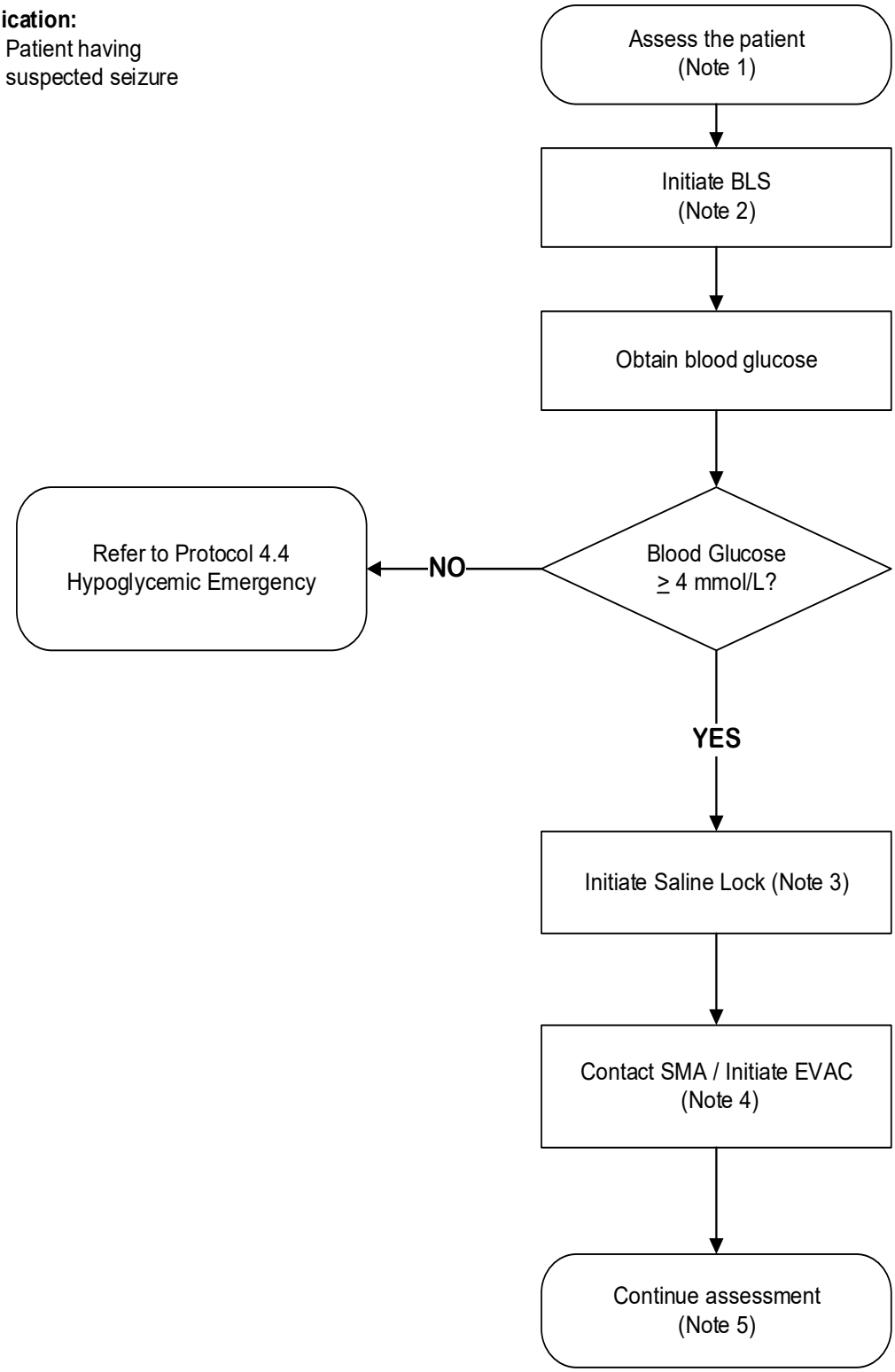
- Unconscious adult patient with an unknown cause.



4.7 Seizure Protocol

Indication:

- Patient having suspected seizure



Notes:

1. Assess the patient and make sure they are safe and not able to injury themselves if in an active seizure. If during a seizure you are able to turn them on their side do so, if you are not able to safely do this during the seizure do if after the seizure is finished to protect the patient's airway and aspiration of bodily fluids (ex. saliva, vomit), until able to access BLS.
2. Initiate BLS; Provide supplementary O_2 by non-rebreather mask if available; Monitor SPO2 closely and be prepared to assist ventilation if needed. Refer to Protocol 2.1 Airway Algorithm.
3. Only initiate an IV if the patient is **NOT** in an active seizure activity.
4. Contact the SMA early. A continued seizure could be due to any number of causes including hypoglycemia, drug withdrawal, fever, infection or head injury.
5. Continue to keep patient safe and prevent injury, and the manage airway.

Section 5

ENVIRONMENTAL PROTOCOLS

Protocol	Name	Page
5.1	Hypothermia Protocol	**76**
5.2	Hyperthermia Protocol	**78**
5.3	Nerve Agent Exposure – **Class B**	**80**

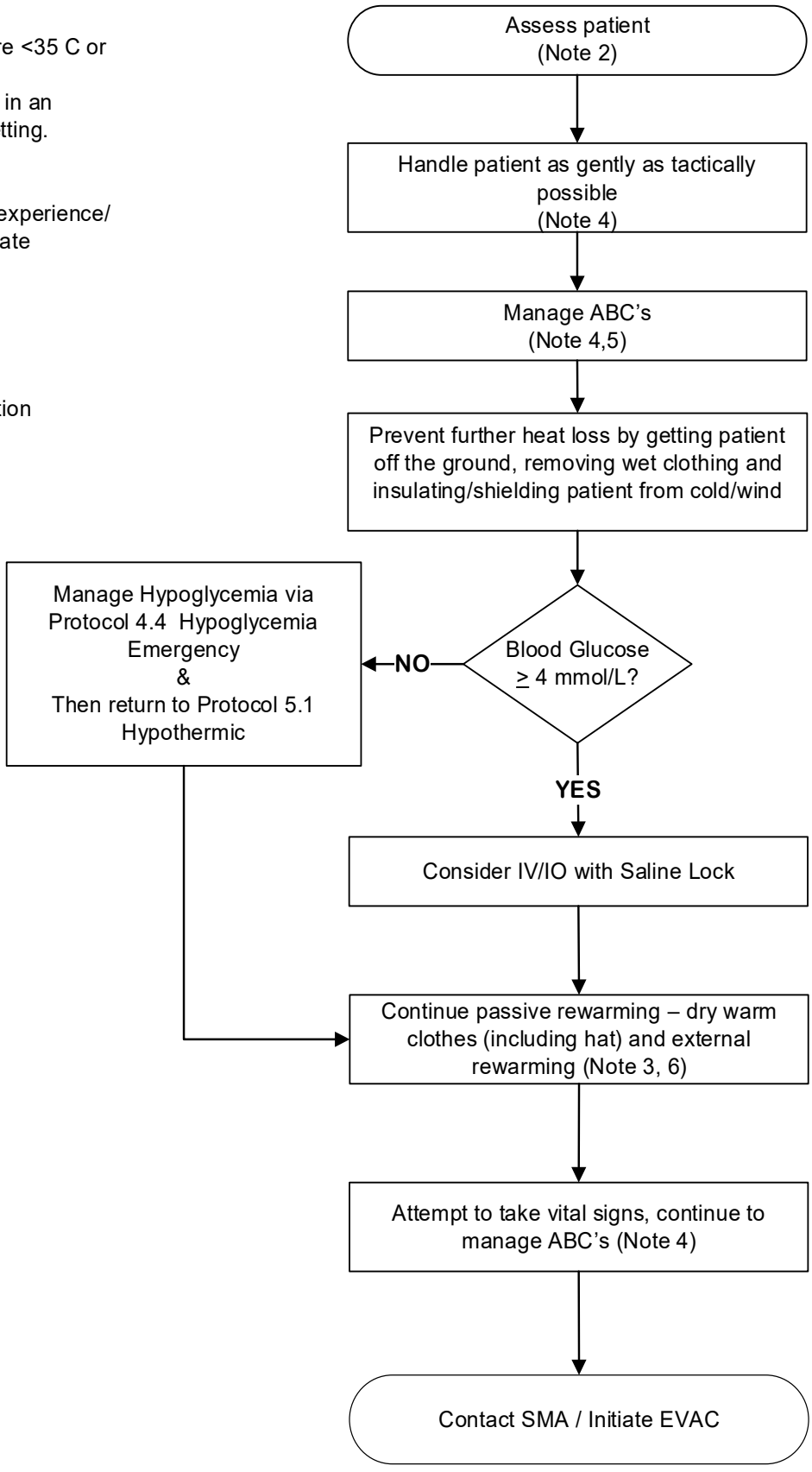
5.1 Hypothermia Protocol

Indication:

- Core body temperature <35 C or patient with S & S of Hypothermia (Note 1) in an appropriate clinical setting.

Risk Factors:

- Lack of cold weather experience/ acclimatization/adequate clothing
- Alcohol consumption
- Cold weather
- Dehydration
- Undernutrition
- Darker skin pigmentation
- Wind chill
- Immersion
- Fatigue



Notes:

1. Signs and Symptoms of degrees of Hypothermia:
    - **Mild** (32 – 35º C)
      Shivering, normal HR, normal RR, vasoconstriction (cold extremities), apathy, slurred speech, ataxia,
    - **Moderate** (28 – 32º C)
      Altered LOC, decreased HR, decreased RR, dilated pupils, **NO SHIVERING.** impaired judgment ("paradoxical undressing").
    - **Severe** (< 28º C)
      Coma, apnea, asystole, nonreactive pupils.
2. Understand pulse and RR may be extremely slow depending on how cold the patient is. Only spend 10 sec checking for a pulse, if none felt start CPR while rewarming.
3. Hot packs to groin, axilla, head; / hypothermia management kit
4. Arrhythmias are much more likely in the hypothermic myocardium and mandate careful patient handling.
5. Hypothermic patients may be defibrillated though it may be theoretically less successful. Continue rewarming as you go through your protocols.
6. If hypothermia management kit/equipment is used, place the active heating blanket on the casualty's anterior torso and under the arms in the axilla (to prevent burns, do not place any active heating source directly on the skin or wrap around the torso). Enclose the casualty with the exterior impermeable enclosure bag.

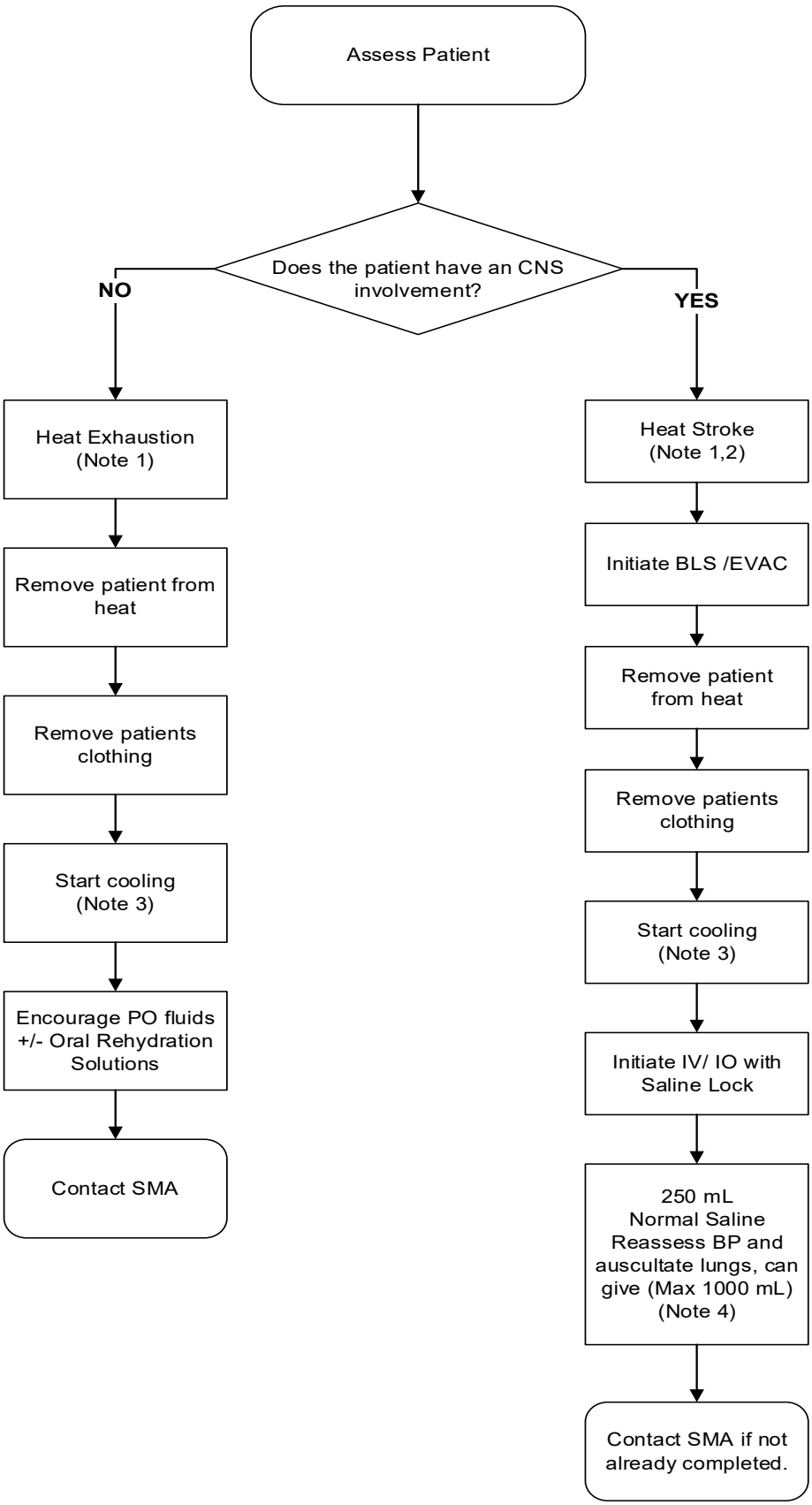
5.2 Hyperthermia Protocol

Indications:

- Core body temperature >40° C or symptoms consistent with Hyperthermia in an appropriate clinical setting.

Risk Factors:

- Warm/Hot weather
- High humidity
- Physical activity
- Drugs/Alcohol
- Dehydration
- Inadequate clothing
- Lack of training/ experience in warm climate
- Obesity



Notes:

1. Types of hyperthermia

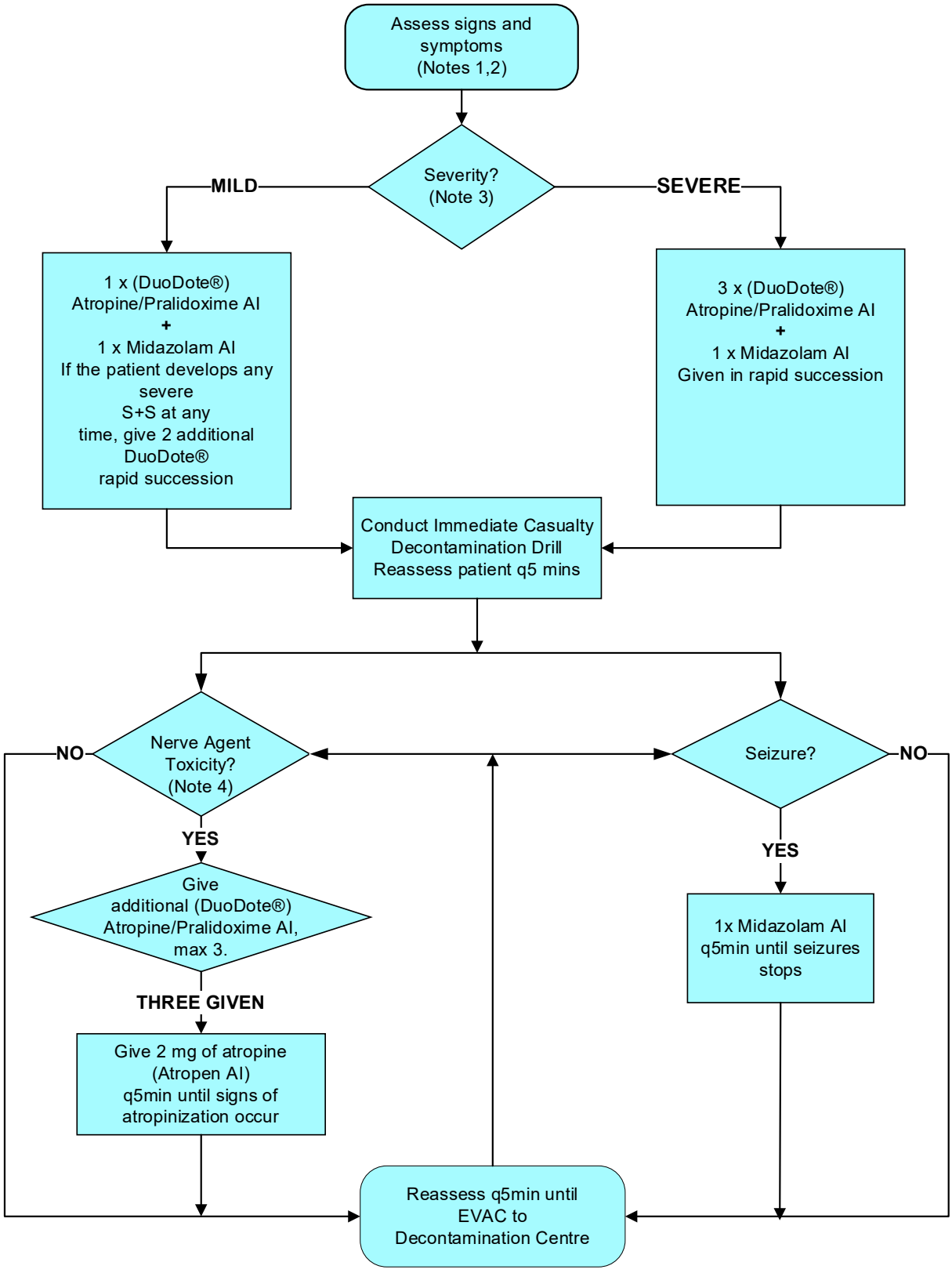
    - **Heat cramps:** Involuntary muscle spasms most often affect calves, arms, abdominal muscles and back.
    - **Heat exhaustion:** Nausea; Muscle cramps; Headache; Feeling faint; Fatigue; Pale/cool/clammy skin; **Heavy sweating**.
    - **Heat stroke:** Core body temperature >40ºC; Confusion; Irrational behavior (or delirium); Tachycardia initially than bradycardia late; Hypotension; Rapid and shallow breathing; Dry or wet hot skin; **No sweating**; Loss of consciousness; Seizures and Coma.

2. A heat stroke casualty requires immediate evacuation whereas a casualty with heat exhaustion may be delayed after consultation with SMA.

3. Cooling methods are dependent on available resources. Wet patient with water, fan dry and repeat. If cold/ice packs are available, pack in groin/axilla/neck.

4. Exertional hyperthermia usually has a component of dehydration. However, too much IV fluid can also be detrimental so contact SMA after 1000mL.

5.3 Nerve Agent Exposure – Class B



Notes*:*

1. For **MARCHE**$^{(2)}$ sequence and immediate actions in a CBRN environment (Refer to Reference 8.34 CBRN /Casualty Assessment – CRESS and 8.33 CBRN Casualty Approach – (MARCHE)^2 or M^{2}A^{2}R^{2}C^{2}H^{2}E^2)
2. Use the acronym **CRESS**: **C**onscious (unconscious/seizure); **R**espiration (increased↑↑/decreased↓); **E**yes (pinpoint pupils); **S**ecretion (increased↑↑); **S**kin (sweaty) and **Other** (vomiting; incontinence; bradycardia).
3. Severity: Mild (Walking; Pinpoint pupils only; Minimal secretions); Severe Non-ambulatory, copious airway secretions, confusion, not obeying commands, severe respiratory distress/arrest, involuntary urination/defecation, convulsions, unconsciousness.
4. Nerve agent toxicity: “Three B’s” Bronchospasm; Bradycardia; Bronchorrhea (production of more than 100mL per day of watery sputum).

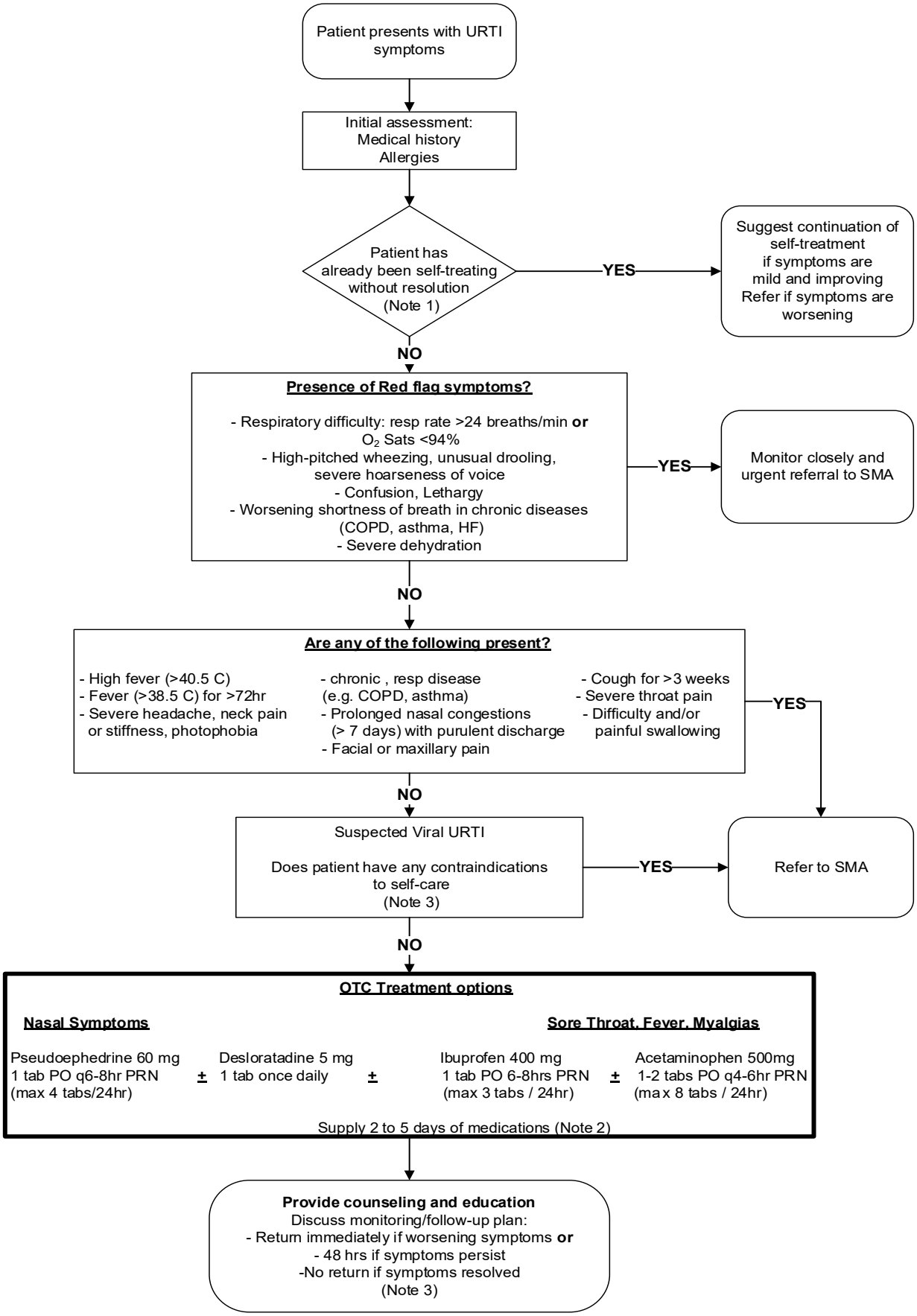
SECTION 6

PRIMARY CARE & OTC PROTOCOLS

RQ Cpl Qualified or higher

Protocol	Name	Page
6.1	OTC URTI	**83**
6.2	OTC Pain	**85**
6.3	OTC Headache	**87**
6.4	OTC Dyspepsia & GERD	**89**
6.5	OTC Dysmenorrhea	**91**
6.6	OTC Motion Sickness	**93**
6.7	OTC Diarrhea	**95**
6.8	OTC Constipation	**97**
6.9	OTC Fungal Infection	**99**
6.10	OTC Atopic Dermatitis / Dry Skin	**100**
6.11	OTC Vaginal Candidiasis	**101**

6.1 OTC- URTI


Patient presents with URTI symptoms
Initial assessment:
Medical history
Allergies
Patient has already been self-treating without resolution (Note 1)
YES
Suggest continuation of self-treatment if symptoms are mild and improving
Refer if symptoms are worsening
NO
Presence of Red flag symptoms?
- Respiratory difficulty: resp rate >24 breaths/min or O_2 Sats <94%
- High-pitched wheezing, unusual drooling, severe hoarseness of voice
- Confusion, Lethargy
- Worsening shortness of breath in chronic diseases (COPD, asthma, HF)
- Severe dehydration
YES
Monitor closely and urgent referral to SMA
NO
Are any of the following present?
- High fever (>40.5 C)
- Fever (>38.5 C) for >72hr
- Severe headache, neck pain or stiffness, photophobia
- chronic , resp disease (e.g. COPD, asthma)
- Prolonged nasal congestions (> 7 days) with purulent discharge
- Facial or maxillary pain
- Cough for >3 weeks
- Severe throat pain
- Difficulty and/or painful swallowing
YES
NO
Suspected Viral URTI
Does patient have any contraindications to self-care (Note 3)
YES
Refer to SMA
NO
OTC Treatment options
Nasal Symptoms
Pseudoephedrine 60 mg 1 tab PO q6-8hr PRN (max 4 tabs/24hr)
±
Desloratadine 5 mg 1 tab once daily
±
Sore Throat, Fever, Myalgias
Ibuprofen 400 mg 1 tab PO 6-8hrs PRN (max 3 tabs / 24hr)
±
Acetaminophen 500mg 1-2 tabs PO q4-6hr PRN (max 8 tabs / 24hr)
Supply 2 to 5 days of medications (Note 2)
Provide counseling and education
Discuss monitoring/follow-up plan:
- Return immediately if worsening symptoms or
- 48 hrs if symptoms persist
-No return if symptoms resolved
(Note 3)

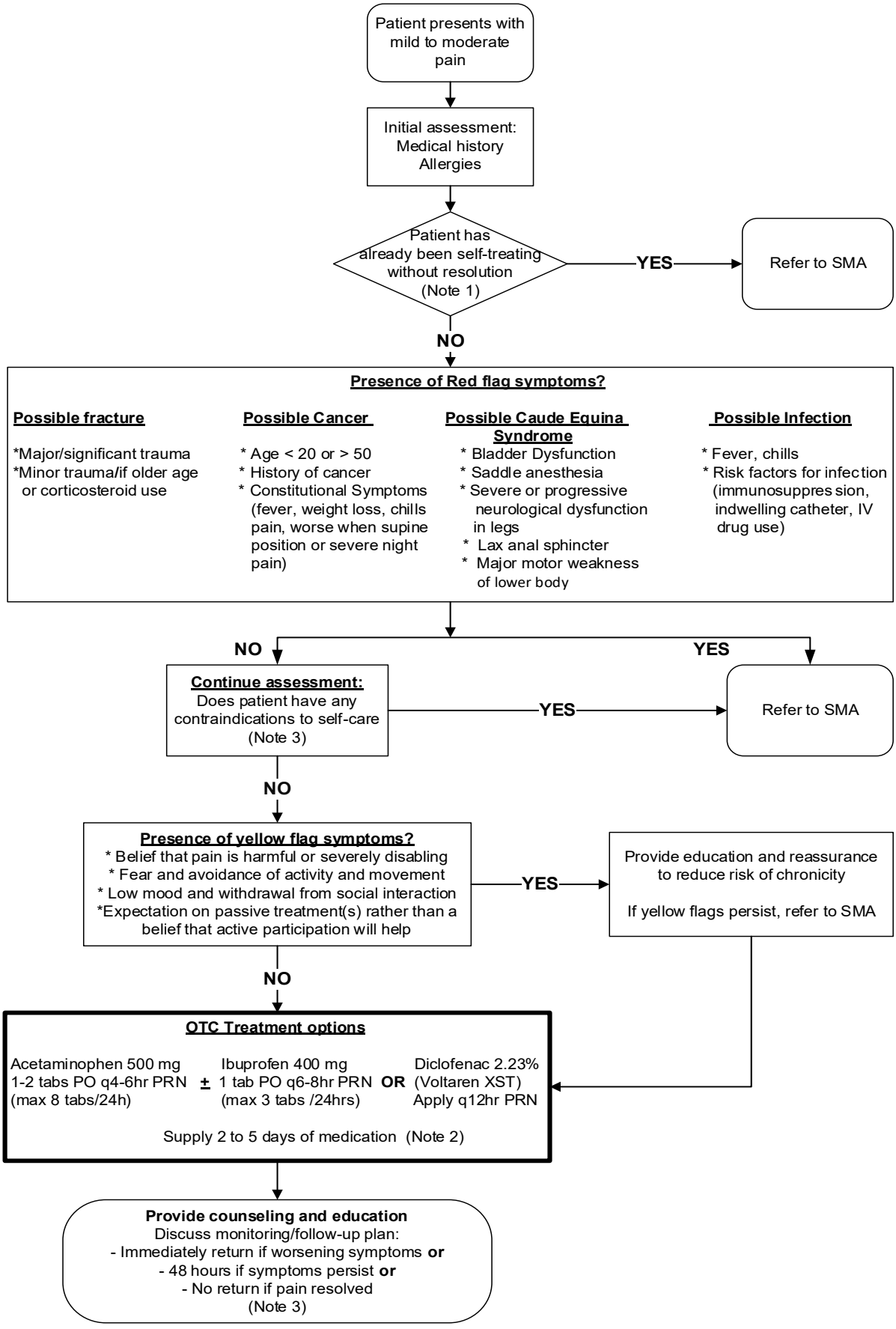
Notes:

1. Self-treatment refers to patients managing the acute onset of their symptoms. This may include taking medications or trying non-pharmacological options to help with symptoms within the past two weeks. For those with chronic pain (asthma, bronchitis, allergies) consider self-treatment of the acute onset/ flare-up rather than management/ prevention of the chronic condition.
2. Contraindications include:
    a. allergy to indicated medication; and
    b. patient currently taking medications that interact with indicated medication.

Considerations:

3. Consider non-pharmacological options such as rest, hydration, face masks and isolation.

6.2 OTC Pain Protocol



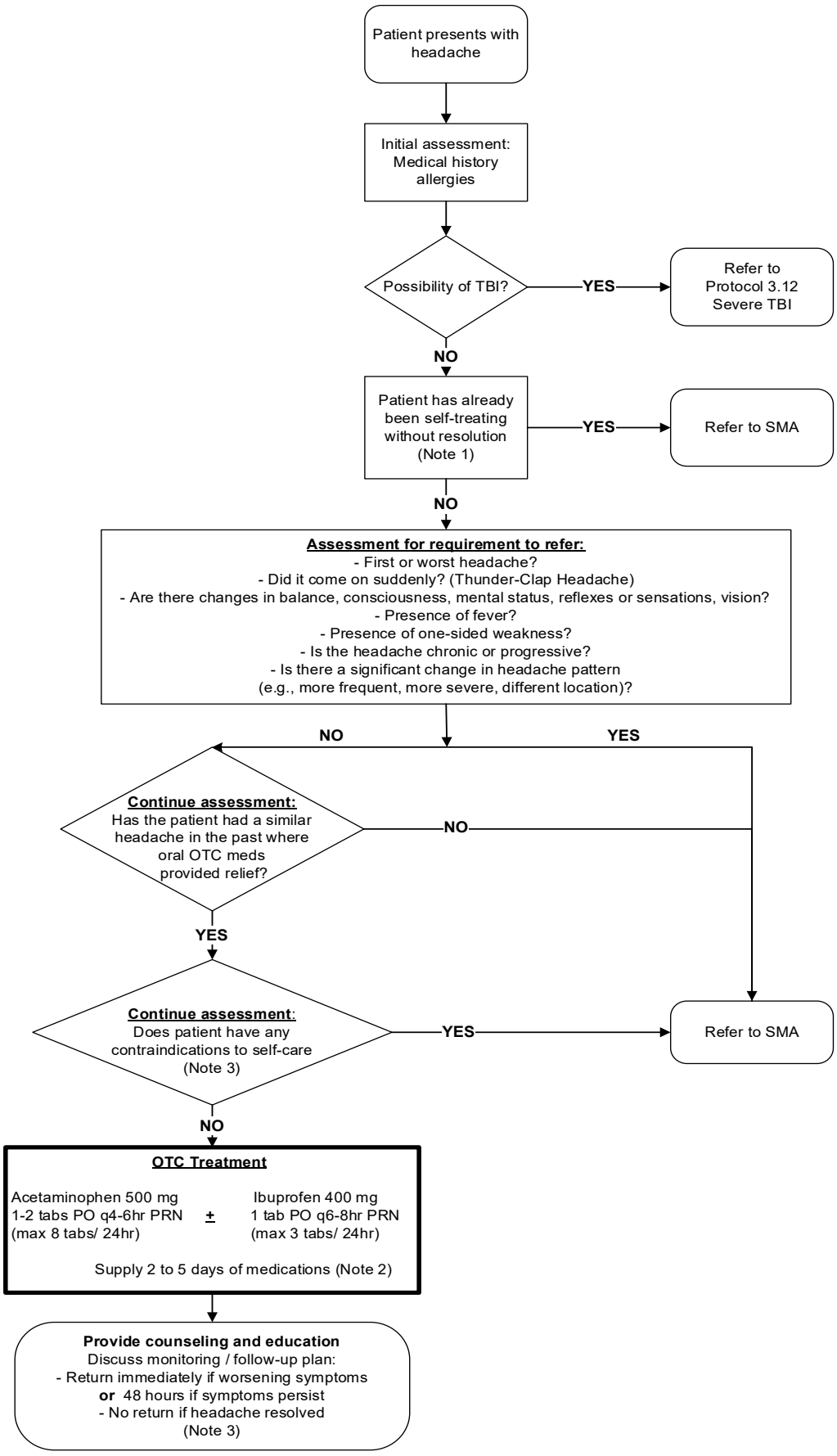
Notes:

1. Self-treatment refers to patients managing the acute onset of their symptoms. This may include taking medications or trying non-pharmacological options to help with symptoms within the past two weeks. For those with chronic pain, consider self-treatment of the acute onset/ flare-up rather than management/ prevention of the chronic condition.
2. Contraindications include:
    a. allergy to indicated medication; and
    b. patient currently taking medications that interact with indicated medication.

Considerations:

3. Consider non-pharmacological options such as rest, ice, compression and elevation (RICE).

6.3 OTC Headache



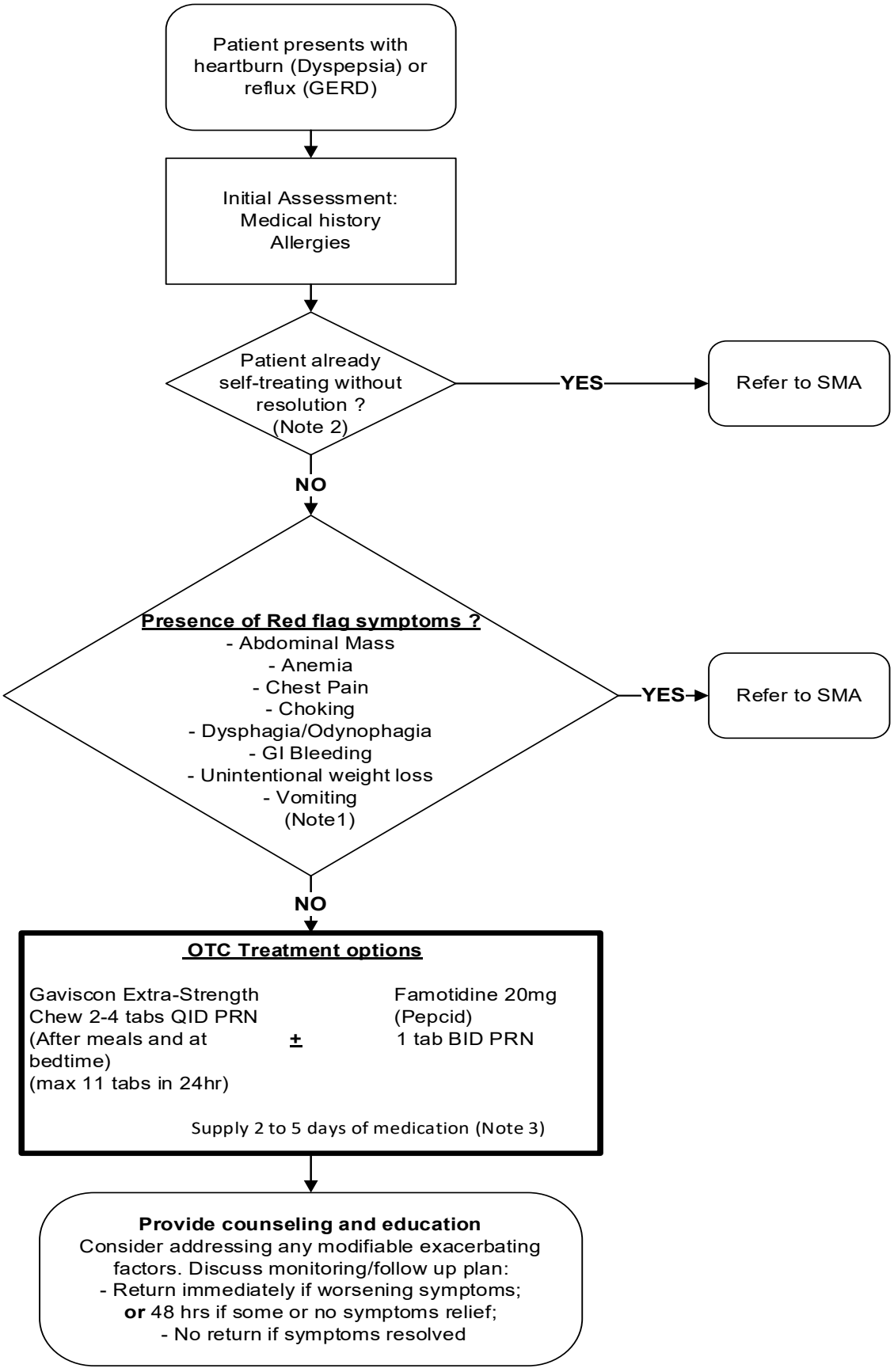
Notes*:*

1. Self-treatment refers to patients managing the acute onset of their symptoms. This may include taking medications or trying non-pharmacological options to help with symptoms within the past two weeks. For those with chronic headaches/ migraines, consider self-treatment of the acute onset/ flare-up rather than management/ prevention of the chronic condition.
2. Contraindications include:
    a. allergy to indicated medication; and
    b. patient currently taking medications that interact with indicated medication.

Considerations:

3. Consider non-pharmacological options such as rest, hydration, light/noise reduction, and heat/cold. Tailor recommendations based on patient history and presentation.

6.4 OTC GERD


Patient presents with heartburn (Dyspepsia) or reflux (GERD)
Initial Assessment:
Medical history
Allergies
Patient already self-treating without resolution ?
(Note 2)
YES
Refer to SMA
NO
Presence of Red flag symptoms ?
- Abdominal Mass
- Anemia
- Chest Pain
- Choking
- Dysphagia/Odynophagia
- GI Bleeding
- Unintentional weight loss
- Vomiting
(Note1)
YES
Refer to SMA
NO
OTC Treatment options
Gaviscon Extra-Strength
Chew 2-4 tabs QID PRN
(After meals and at bedtime)
(max 11 tabs in 24hr)
±
Famotidine 20mg
(Pepcid)
1 tab BID PRN
Supply 2 to 5 days of medication (Note 3)
Provide counseling and education
Consider addressing any modifiable exacerbating factors. Discuss monitoring/follow up plan:
- Return immediately if worsening symptoms;
or 48 hrs if some or no symptoms relief;
- No return if symptoms resolved

Notes:

1.

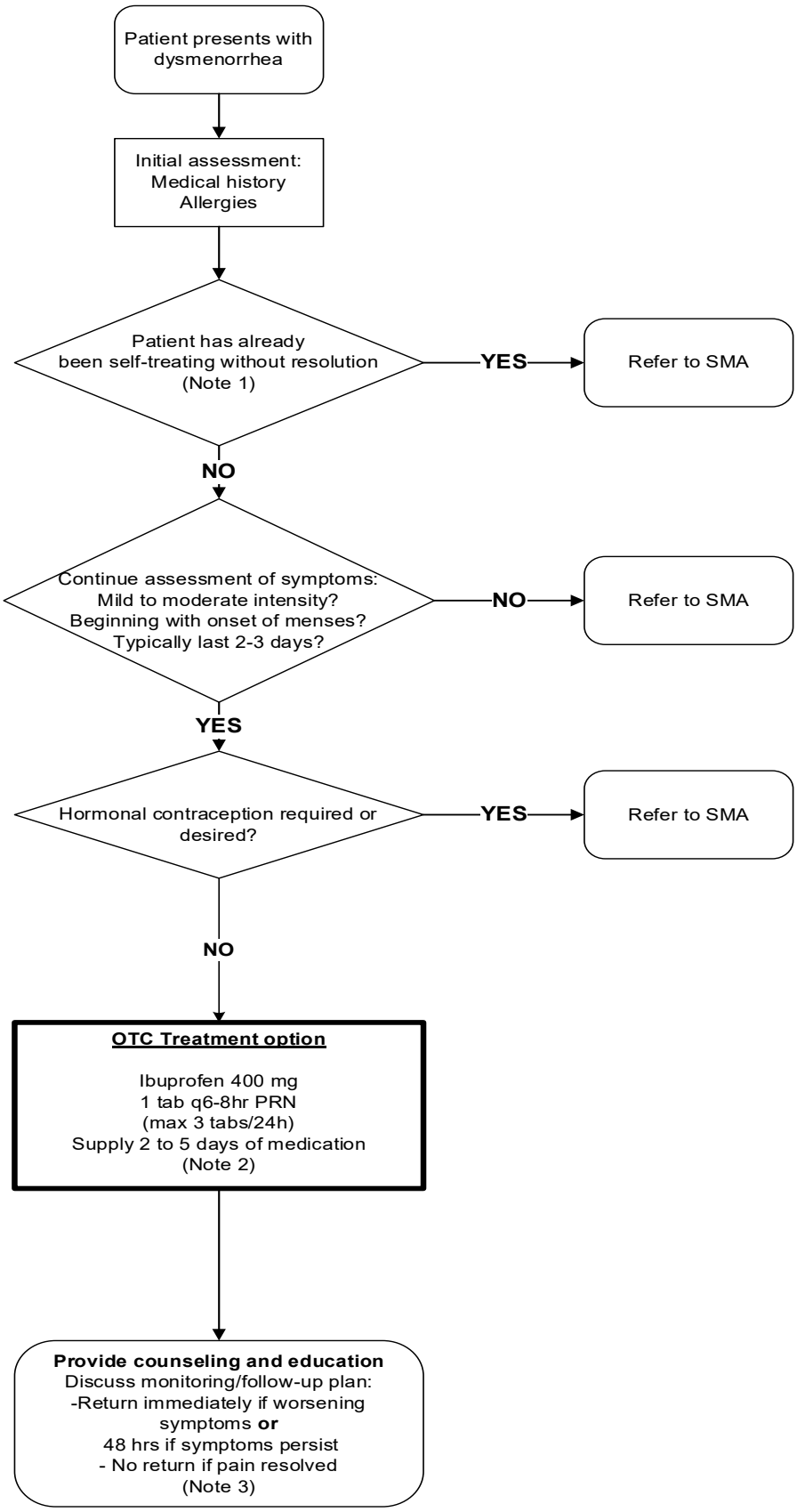
Alarm Symptom	Description
Abdominal Mass	Abnormal growth or swelling in abdomen
Anemia	Dizziness, Fatigue, syncope, pale appearance, cold extremities
Chest Pain	Resembling cardiac pain (pain with activity)
Choking	Sensation of acid refluxed into the windpipe causing shortness of breath, coughing or hoarseness
Dysphagia / Odynophagia	Difficulty / Pain swallowing
Gastrointestinal bleeding	Vomiting blood or having tarry or black bowel movements
Unintentional weight loss	
Vomiting	

2. Self-treatment refers to patients managing the acute onset of their symptoms. This may include taking medications or trying non-pharmacological options to help with symptoms within the past two weeks.

3. Contraindications include:

    a. allergy to indicated medication; and
    b. patient currently taking medications that interact with indicated medication.

6.5 OTC Dysmenorrhea



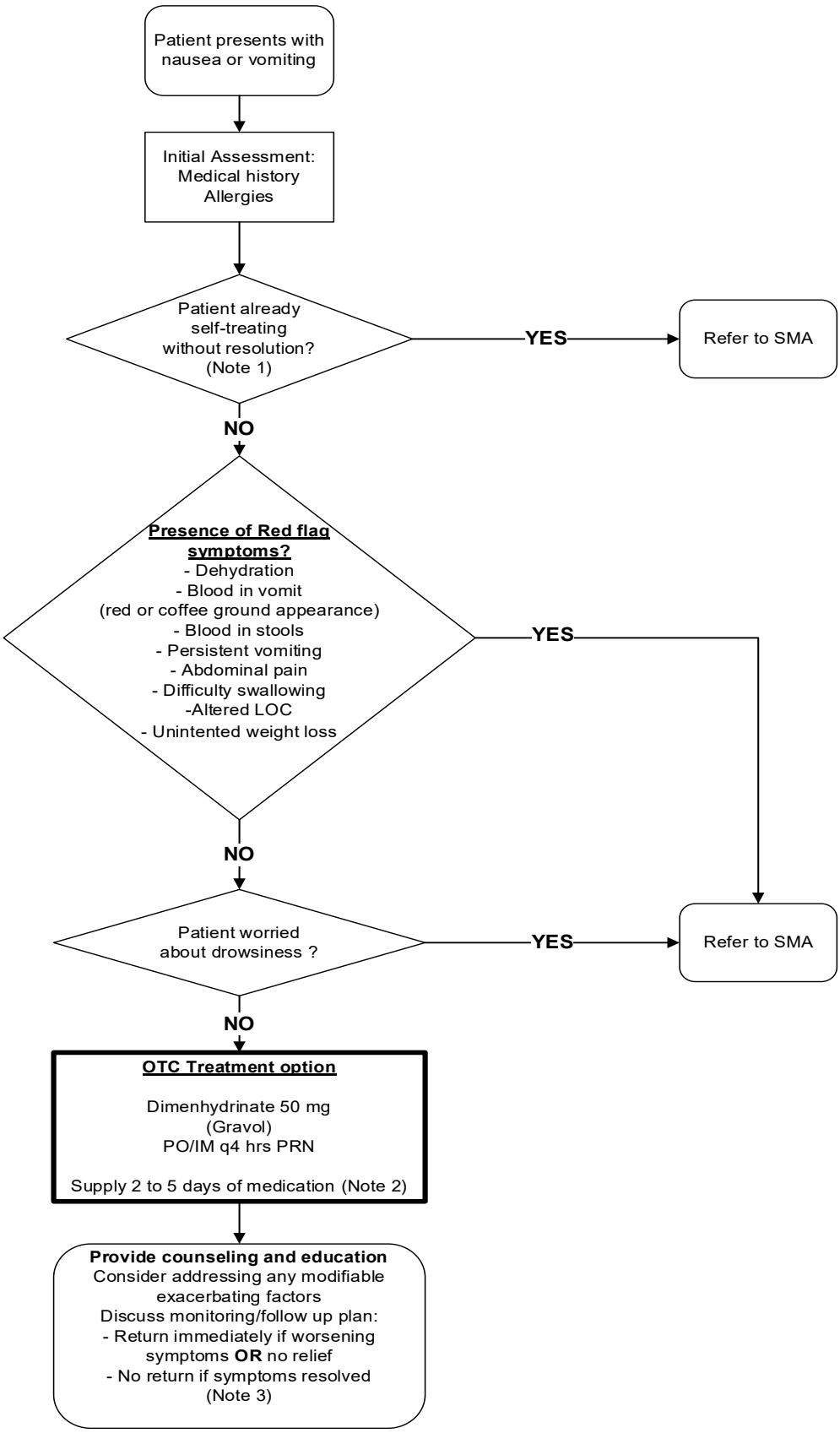
***Notes*:**

1. Self-treatment refers to patients managing the acute onset of their symptoms. This may include taking medications or trying nonpharmacological options to help with symptoms during the current menses.
2. Contraindications include:
    a. allergy to indicated medication; and
    b. patient currently taking medications that interact with indicated medication.

Considerations:

3. Consider non-pharmacological options such as low intensity exercise, such as stretching or yoga. For most women, drug therapy is required, and nonpharmacological measures are used adjunctively

6.6 OTC Motion Sickness



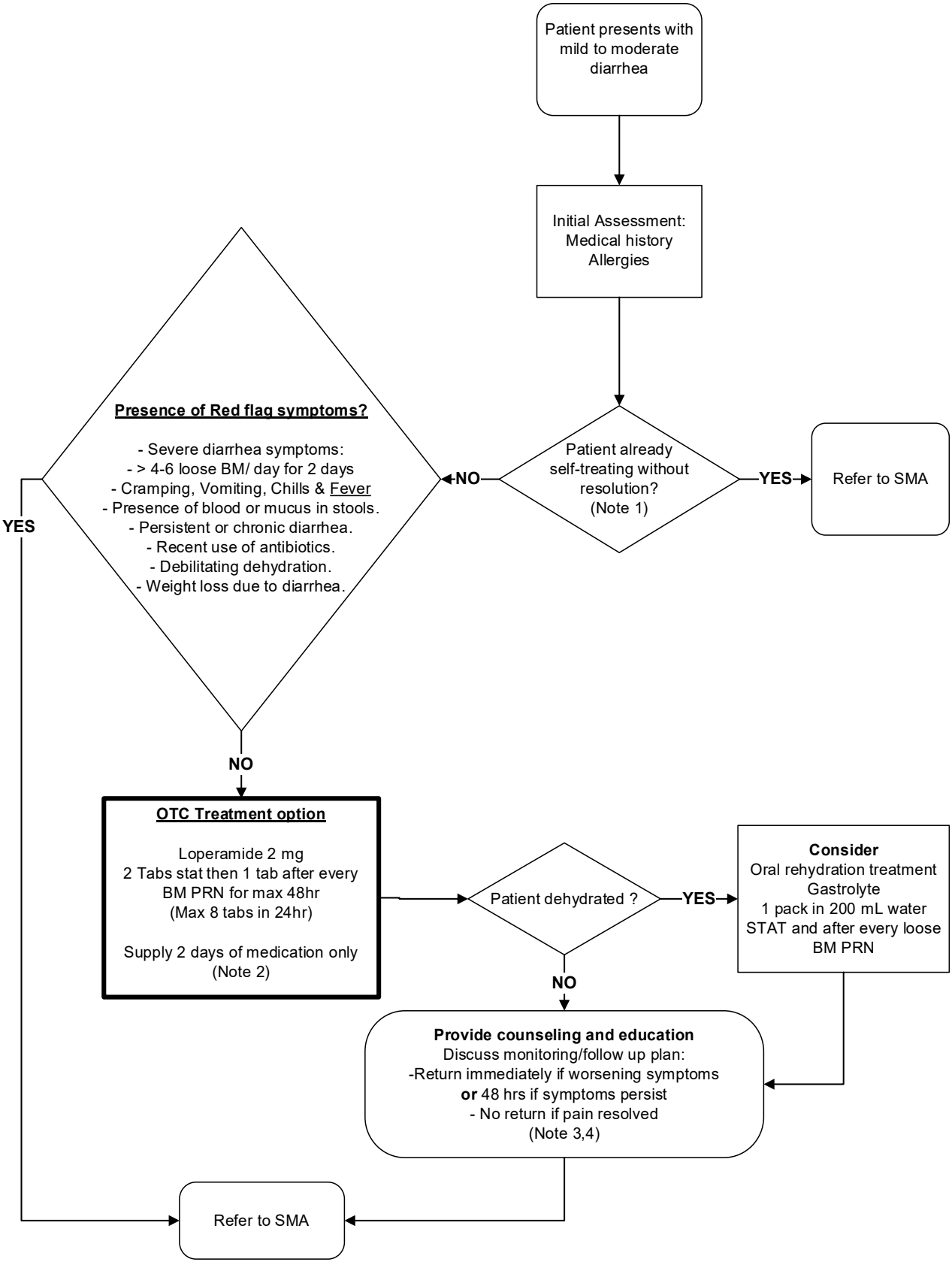
Notes*:*

1. Self-treatment refers to patients managing the acute onset of their symptoms. This may include taking medications or trying nonpharmacological options to help with symptoms.
2. Contraindications include:
    a. allergy to indicated medication; and
    b. patient currently taking medications that interact with indicated medication.

Considerations:

3. Consider non-pharmacological options such as a bland diet, rest, sit in the front seat of the vehicle, look over the horizon if being a passenger.

6.7 OTC Diarrhea



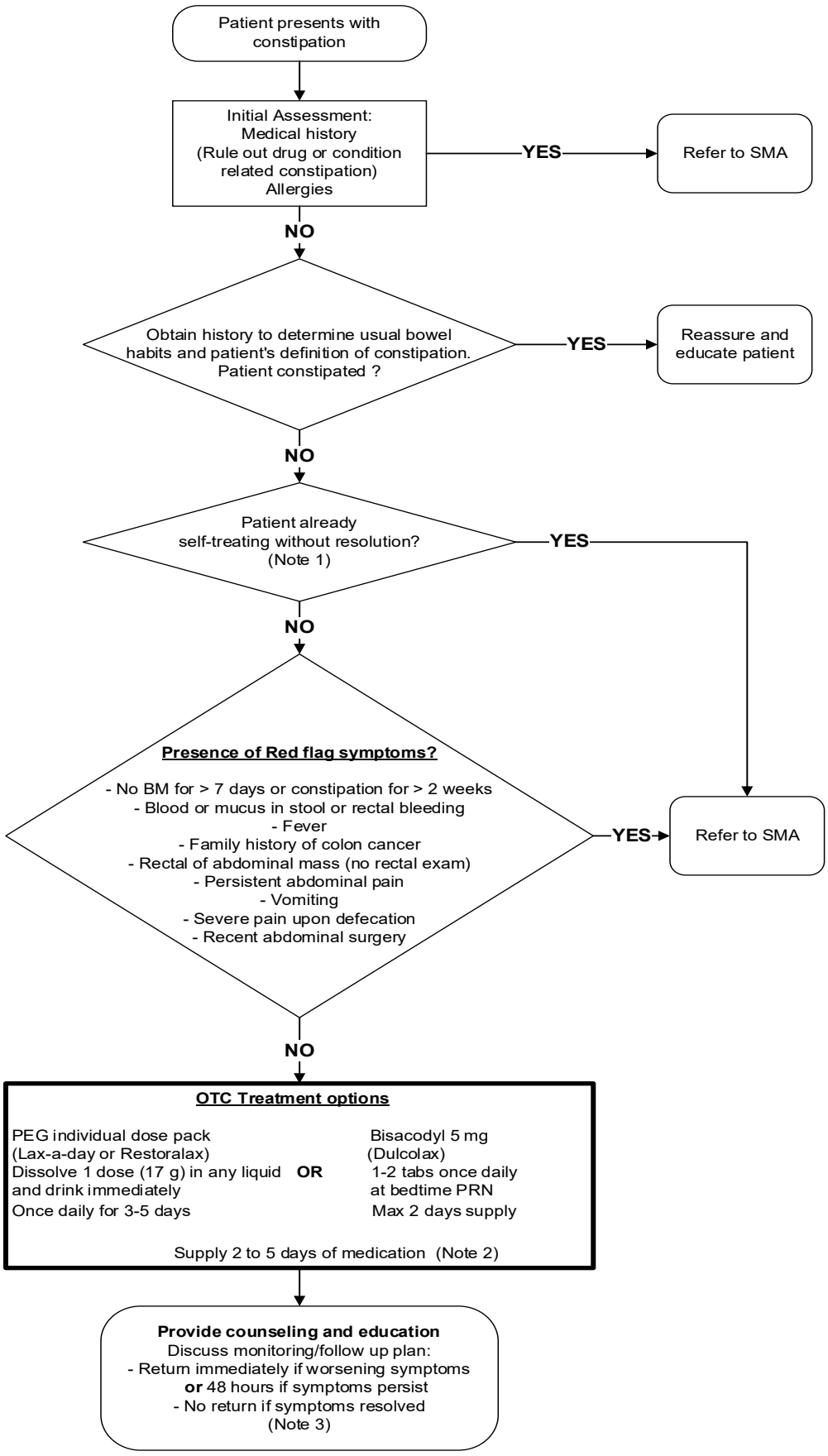
Notes:

1. Self-treatment refers to patients managing the acute onset of their symptoms. This may include taking medications or trying nonpharmacological options to help with symptoms.
2. Contraindications include:
    a. allergy to indicated medication; and
    b. patient currently taking medications that interact with indicated medication.

Considerations:

3. Consider non-pharmacological options such as a bland diet, no dairy, decrease sugar intake, rest and fluids to help stay hydrated.
4. Refer to SMA if patient returns with worsening, continuing or unresolved symptoms.

6.8 OTC Constipation



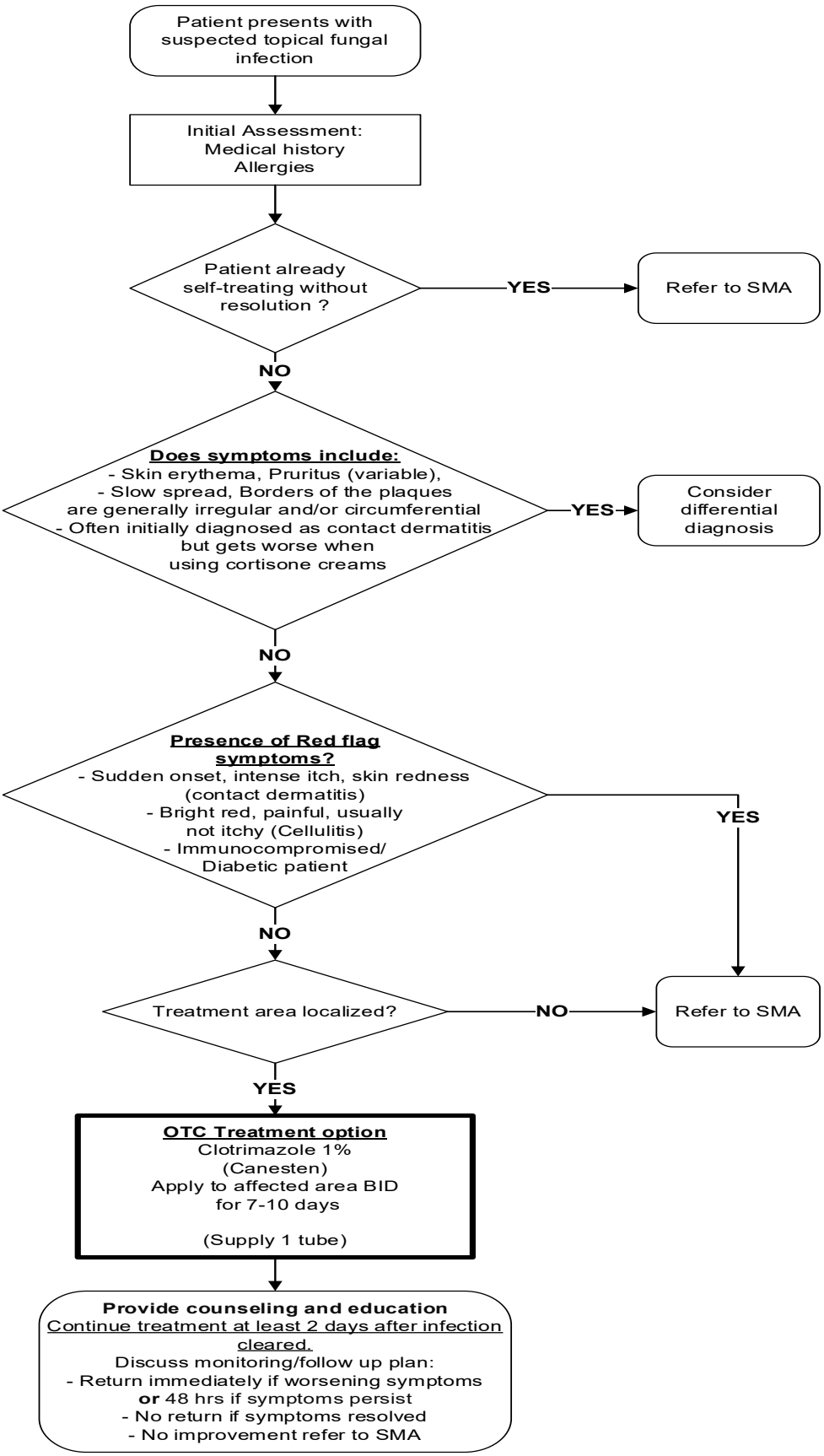
Notes*:*

1. Self-treatment refers to patients managing the acute onset of their symptoms. This may include taking medications or trying nonpharmacological options to help with symptoms of constipation.
2. Contraindications include:
    a. allergy to indicated medication; and
    b. patient currently taking medications that interact with indicated medication.

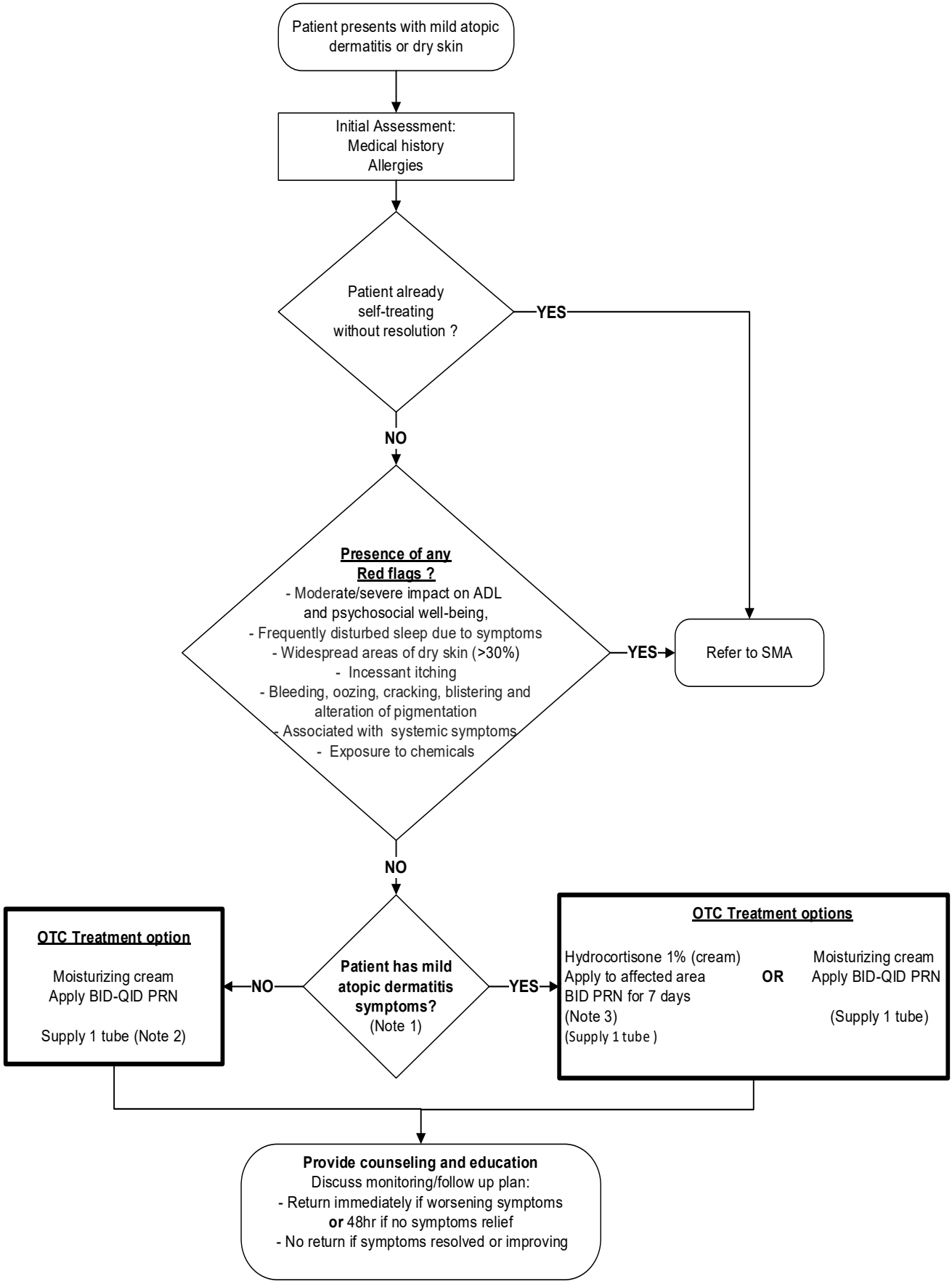
Considerations:

3. Consider non-pharmacological options such as increase water intake, fiber intake and increase exercise or movement.

6.9 OTC Fungal Infections



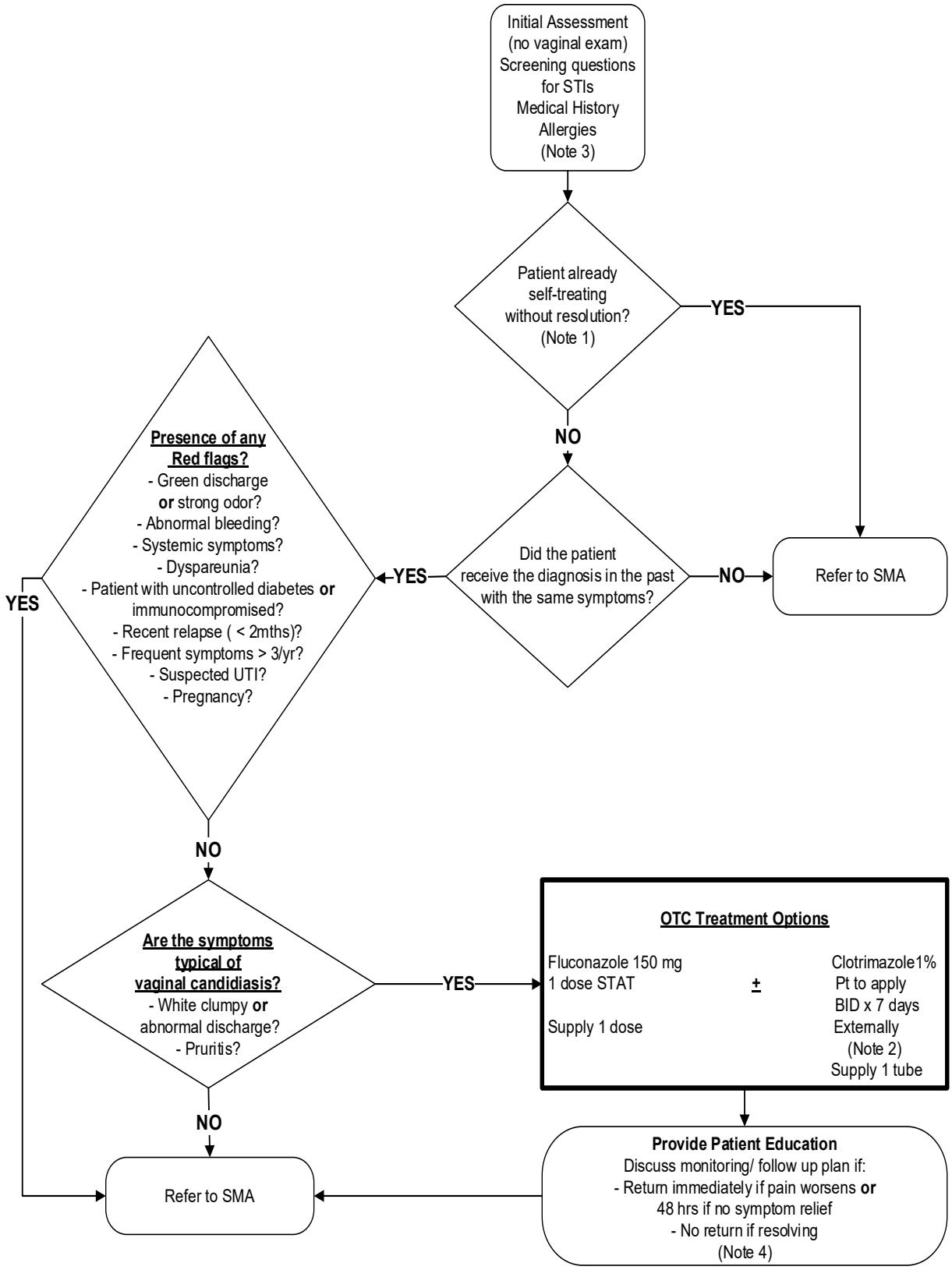
6.10 OTC Atopic Dermatitis / Dry Skin



Notes*:*

1. Mild Atopic dermatitis symptoms include Areas of dry skin, infrequent itching (with or without small areas of redness), little impact on ADL, sleep, and psychosocial well-being. ADL = Activities of daily life.
2. Consider using moisturizer to prevent relapse.
3. Avoid application around the eyes.

6.11 OTC Vaginal Candidiasis



Notes:

1. Self-treatment refers to patients managing the acute onset of their symptoms. This may include taking medications or trying nonpharmacological options to help with symptoms during the current menses.
2. Contraindications include:
    a. allergy to indicated medication; and
    b. patient currently taking medications that interact with indicated medication.
3. **No** vaginal exam is to be performed by a Combat Medic.
4. Refer to SMA if patient returns with worsening, continuing or unresolved symptoms.

SECTION 7

DRUG MONOGRAPH

The drug monographs in this section are provided in the context of this Protocol and Procedure Manual. Accordingly, the following monographs contain pharmacological information, dosing and direction for administration that is intended to directly reflect and be applied in the confines of, the preceding protocols.

The medications in this section are indicated for life-saving interventions, treatments or adjuncts. Any precautions listed are strictly included for a more fulsome understanding of the drug and, in an emergent setting, would not generally prelude administration. The information contained in this section is also, accordingly, not applicable to other areas of practice/situations. For non-emergent, routine use, refer to your Scope of Practice and a full drug monograph.

This section covers the drug monographs for:

7.1	Acetaminophen (Tylenol)	7.20	Ketamine
7.2	Acetylsalicylic Acid (ASA)	7.21	Lactated Ringer's (Ringer's Lactate)
7.3	Antacid	7.22	Loperamide
7.4	Atropine AI (CBRN)	7.23	Methoxyflurane (Penthrox)
7.5	Bisacodyl (Dulcolax)	7.24	Meloxicam
7.6	Desloratadine	7.25	Midazolam (CBRN)
7.7	Dextrose Tablets (Dex 4)	7.26	Moxifloxacin
7.8	Diclofenac (Voltaren)	7.27	Naloxone (Narcan)
7.9	Dimenhydrinate (Gravol)	7.28	Nitroglycerin
7.10	Epinephrine	7.29	Normal Saline (NS)
7.11	Ertapenem	7.30	Obidoxime (CBRN)
7.12	Famotidine (Pepcid)	7.31	Oxygen
7.13	Fentanyl Lozenges	7.32	PEG
7.14	Fluconazole (Diflucan)	7.33	Pseudoephedrine (Sudafed)
7.15	Fluorescein	7.34	Salbutamol (Ventolin)
7.16	Gastrolyte	7.35	Tetracaine
7.17	Glucagon	7.36	Tranexamic Acid (TXA)
7.18	Hydrocortisone 1%	7.37	Xylocaine 1% without Epi
7.19	Ibuprofen		

7.1 Acetaminophen (Tylenol, Atasol, Tempra)

Indications: Protocol 3.8 Pediatric Pain /Protocol 3.9 Adult Pain / Protocol 6.1 OTC URTI / Protocol 6.2 OTC Pain Protocol / 6.3 OTC Headache

Contraindications: Hypersensitivity to acetaminophen; Known G6PD deficiency; Liver failure.

Precautions: May cause severe liver toxicity in overdose. Use cautiously in patients with alcoholic liver disease.

Excessive alcohol intake can increase risk of acetaminophen-induced liver toxicity.

Adverse Effects: Uncommon, as <1% patients experience any adverse effects.

Pharmacology: Onset of action: <1hr. Time to peak effect: Oral dosing: 10-60min. Duration of action: 4-6hrs.

Dosage and Administration:

- Adults over 16yrs: 1000mg PO q6hr PRN (max/24hrs: 4000mg). / Dosing for OTC Protocol 500 – 1000mg q4-6hrs PRN
- Children 4-16yrs: 15mg/kg q6hr (max/24hrs: 75mg/kg, do not exceed 4000mg).
- Children under 4yrs: Contact PA/ NP/ MO

7.2 Acetylsalicylic Acid (Aspirin, ASA)

Indications: Protocol 1.1 Suspected Cardiac Chest Pain

Contraindications: Hypersensitivity to ASA or other anti-inflammatories; Bleeding disorder; Or active gastrointestinal bleeding. Not for use in children <12yrs old (Reyes Syndrome).

Precautions: Use with caution in patients with a history of asthma or nasal polyps.

Adverse Effects: Mainly gastrointestinal complaints; Nausea; Heartburn.

Pharmacology: Onset of action: <1hr. Time to peak effect: Oral chewable dose: 2hrs. Duration of action: 4-6hrs.

Dosage and Administration:

- Chewable ASA 160mg PO (single dose only).
- If chewable ASA 160mg is not available, give ASA 325mg preferably non-enteric coated to chew (single dose only).

Non-chewable ASA can be chewed if needed. However, the absorption may be delayed.

Enteric coated tablet could also be chewed if that is all that is available, but the time to peak concentration would be significantly delayed in comparison to chewable or non-chewable immediate release tablet.

7.3 Antacid (Gaviscon)

Indication: Protocol 6.4 OTC Dyspepsia or GERD

Contraindications: Hypersensitivity to any ingredient

Precaution: Not to be used for treatment of peptic ulcers. Patients on a restricted magnesium and/or sodium restricted diet should avoid and not to be used in patients with renal disease. **DO NOT TAKE** within 2hours of another medication because of effectiveness maybe altered.

Adverse Reaction: Constipation (aluminum hydroxide), diarrhea (magnesium salts). Constipating effect of aluminum is meant to offset the diarrhea producing action of magnesium, but in most patients, diarrhea predominates.

Pharmacology: Onset: 3-5min. Time to peak effect: 30min (approximately). Duration: approx. 90min (Patient Self Care)

Dosage and Administration: Gaviscon Extra Strength Chew 2-4 tablets after meals and at bedtime (4 times a day) as needed with water or other liquid. Maximum 11 tablets in 24hrs. Do not swallow chewable tablets whole. Doses should be separated by at least 2hrs.

****Note**: Various combinations of antacids can be present in different formulations of Gaviscon. Please carefully read all labels on the product package you receive prior to the use of any Gaviscon products to confirm dosage and administration.

7.4 Atropine (Antiparasympathetic /Anticholinergic agent)

Indications: Protocol 5.3 Nerve Agent Exposure

Contraindications: Hypersensitivity; Narrow angle glaucoma; Myasthenia gravis; GI disorders involving movement of bowels; Thyrotoxicosis; Prostatic hypertrophy; Unstable cardiovascular status with tachycardia and during acute hemorrhage.

Note: In nerve agent exposure, risk versus benefit assessment is crucial.

Precautions: Atropine is a highly potent anticholinergic (or antiparasympathetic) and can lead to anticholinergic toxicity if care is not taken to avoid overdose (e.g. Acute glaucoma with blindness; Agitation; Delirium; Confusion; Drowsiness; Tachycardia).

Adverse Effects: Tachycardia; Headache; Restlessness; Insomnia; Dizziness; Dry and hot skin; Light sensitivity; Urticaria; Dry mouth; Impaired GI mobility; Blurred vision; Mydriasis.

Note: In nerve agent exposure, risk versus benefit assessment is crucial.

Pharmacology: Onset of action: Increased HR ~2-40min; salivation inhibited ~30min. Time to peak effect (IM): 20-90min.

Dosage and Administration:

- Atropine Sulfate 2mg per auto-injector (Atropine AI or DOUBLEPEN Obidoxime/Atropine).
- DOUBLEPEN Obidoxime/Atropine (auto-injector) q15min PRN up to 3 doses max.
- Only give Atropine AI q5min PRN (after 3 doses of DOUBLEPEN OA).

7.5 Bisacodyl (Correctol, Dulcolax)

Indication: Protocol 6.8 OTC Constipation

Contraindications: Patients who are hypersensitive to this drug or to any ingredient in the formulation

Precaution: As with all laxatives, DULCOLAX should not be taken on a continuous daily basis or for extended periods without investigating the cause of constipation. Prolonged excessive use may lead to fluid and electrolyte imbalance and hypokalemia.

Adverse Reaction:

- **Common** (1% to 10%): Abdominal cramps, abdominal pain, diarrhea, nausea
- **Uncommon** (0.1% to 1%): Abdominal discomfort, anorectal discomfort, blood in stool/ hematochezia, vomiting

Pharmacology: Onset: 6-12hrs**;** Time to peak effect: approx. 8hrs

Dosage and Administration: TABLET: 10mg orally once a day (max 2 days supply)

- Swallow whole and do not take within an hour of milk or dairy products or antacids or proton pump inhibitors.

7.6 Desloratadine (Aerius)

Indication: Protocol 6.1 OTC URTI

Contraindications: Avoid in patients with hypersensitivity to loratadine.

Precaution: Use with caution in patients with severe liver or renal insufficiency and in patients with medical or family history of seizures

Adverse Reaction: Headache, pharyngitis, dyspepsia.

Pharmacology: Onset: approx. 75min**;** Time to peak effect: 3hrs**;** Duration: 24hrs

Dosage and Administration: Adults and children ≥12yrs: 5mg once daily

7.7 Dextrose Tabs (Dex 4)

Indications: Protocol 4.4 Hypoglycemic Protocol

Contraindications: Hypersensitivity to any ingredients.

Precautions: Not to be administered to an unconscious patient or a patient that is unable to swallow.

Adverse Reaction: This product has very few side effects. Allergic reaction to this drug is rare. If symptoms of an allergic reaction include rash, itching, swelling of the tongue, lips or face, dizziness, contact SMA.

Dosage and Administration:

- Take 4 tablets of Dex 4 by mouth, chewed. Take blood glucose after 15min < 4mmol/L, repeat another 4 tablets of Dex 4, contact SMA.

7.8 Diclofenac (Voltaren)

Indication: Protocol 6.2 OTC Pain.

Contraindications: Hypersensitivity to diclofenac, acetylsalicylic acid (ASA) or non-steroidal anti-inflammatory drugs (e.g. ibuprofen, naproxen); avoid concomitant use of other products containing diclofenac or other non-steroidal anti-inflammatory drugs; avoid use during the last trimester of pregnancy.

Precautions: Apply only to intact, non-diseased skin and not to skin wounds or open injuries. Avoid eyes or mucous membranes; Discontinue if a skin rash develops; Avoid excessive exposure to sunlight.

Adverse Reaction: Local irritation, erythema, pruritus or dermatitis and skin photosensitivity.

Dosage and Administration:

- Diclofenac Extra Strength 2.32% Gel: Apply to the affected area q12hrs PRN. The total dose should not exceed 4g per day overall to affected area. Use the dosing card available in drug product carton. Do not use more than 7 days unless recommended by a SMA.

7.9 Dimenhydrinate (Gravol)

Indications: Protocol 1.1 Suspected Cardiac Chest Pain / Protocol 4.5 Nausea & Vomiting/ Protocol 6.6 OTC Motion Sickness

Contraindications: Hypersensitivity to dimenhydrinate; Glaucoma; Chronic lung disease; Difficulty in urination due to prostatic hypertrophy.

Precautions: Use of alcohol should be avoided, occupational hazard. Should not be used with other sedatives unless MO is consulted.

Adverse Effects: Drowsiness and dizziness are reported most frequently, particularly with higher dosages. Pain may occur at the side of IM injection. Since dimenhydrinate contains 50% diphenhydramine side effects must also be considered. Dry mouth; Excitement in children; Nausea.

Pharmacology: Onset of action: IM: 20-30 mins; PO: 15-30min. Time to peak effect: 60-120 mins.

Duration: 4-6hrs.

Dosage and Administration:

- Adults: 25-50mg PO/ IM q4hrs PRN (max 400 mg in 24hrs).
- Children > 2 years of age: Between 15-50 mg; consult MO prior to giving medication.
- Children < 2 years of age: Not recommended.

7.10 Epinephrine (Adrenaline - EpiPen®, EpiPen® Jr, Epinephrine ampule)

Indications: Protocol 2.2 SOB Suggestive of Asthma/COPD/ Protocol 2.3 Anaphylaxis/Anaphylactic Shock – Adult & Children ≤ 30kg **/** Protocol 2.4 Anaphylaxis /Anaphylactic Shock – Adult &Children > 30kg

Contraindication: There are no contraindications to giving epinephrine for a life-threatening allergic response such as anaphylaxis.

Precautions: Use with caution in: Elderly; Diabetes mellitus; Cardiac arrhythmias; cardiovascular disease; Thyroid disease. Watch for tachycardia and hypertension, which may compromise a patient with poor cardio-pulmonary reserve. Be prepared to go to the Protocol 1.1 Cardiac Chest Pain.

Adverse Effects: Tachycardia; Arrhythmias; Angina; Flushing; Anxiety; Tremor; Headache; Dizziness; Nausea and vomiting (in children); Dry mouth; Acute urinary retention in patients with bladder outflow obstruction; Weakness and trembling; Wheezing and dyspnea; and increased diaphoresis.

Pharmacology: Onset of action: 5-10min (IM); Peak Effect: 15-20min; Duration: 4hrs.

Dosage and Administration:

SOB Suggestive of Asthma /COPD (Adult):

Epinephrine 0.3mg IM x 1 dose.

Anaphylaxis/Anaphylactic Shock:

- Above 30kg: EpiPen® (0.3mg) IM q5min PRN x 3 doses. Epinephrine 0.3mg IM q5min PRN x 3 doses.
- 15-30kg: EpiPen® Jr (0.15mg) IM q5min PRN x 3 doses. Epinephrine 0.15mg IM q5min PRN x 3 doses.
- Under 15kg: Epinephrine 0.01 mg/kg IM q5min PRN x 3 doses (max of 0.14mg per dose).

The preferred site for administration of Epinephrine IM is in the thigh (use the shoulder as an alternative). Massage the site after administration to promote localized circulation of blood. Keep EpiPen® needle in the muscle for 5 sec.

If you use Epinephrine ampoule, remember that it contains more than one dose in each ampule. **Storage:** Protect medication from light.

7.11 Ertapenem (Invanz)

Indication: Protocol 4.2 Antibiotic

Contraindications: Known hypersensitivity to ertapenem or β-lactams (e.g. penicillin's, cephalosporins) and/or know hypersensitivity to local anesthetics (Lidocaine) (IM admin)

Precautions: Use caution if history of CNS disorders, seizures and/or compromised renal function as increased risk of seizure and other CNS adverse effects reported

Drug Interactions: Avoid co-administration with valproic acid or divalproex sodium, breakthrough seizures have occurred.

Adverse Effects: Diarrhea, Infused Vein Complications, Nausea, Headache, Vomiting,

Pharmacology: Broad spectrum antibiotic which inhibits bacterial cell wall synthesis.

Dosage and Administration:

- **Adult** (≥ 13yrs) – 1g IM q24hrs.
- **Children** (≥3m but <13yrs) – 15mg/kg IM q12hrs. (max 1g total / day)

7.12 Famotidine (Pepcid)

Indication: Protocol 6.4 OTC Dyspepsia or Reflux (GERD)

Contraindications: Hypersensitivity to famotidine

Precaution: Response to therapy with famotidine does not exclude cardiac or gastric disease (Monitor or Follow-up). Prolonged use may impair the absorption of protein-bound Vitamin B12 and may contribute to the development of cyanocobalamin (Vitamin B12) deficiency.

Drug Interactions: The reduction in gastric pH induced by ranitidine may impact the bioavailability of certain drugs. This can result in either an increase in absorption (e.g. midazolam) or a decrease in absorption (e.g. Ketoconazole). (Monitor)

Adverse Reaction: Most commonly, headache and GI related – nausea, vomiting, diarrhea, constipation.

Pharmacology: Famotidine is a competitive, reversible inhibitor of the action of histamine at the histamine H2-receptors, on the gastric cells. Famotidine is 43% absorbed after oral administration a with mean peak levels, occurring 1-3hrs after a 20mg dose**.**

Dosage and Administration: 20 mg PO BID PRN

7.13 Fentanyl Lozenge

Indication: Protocol 3.9 Adult Pain

Contraindications: Acute/Severe bronchial asthma/COPD/Status asthmaticus; Acute respiratory depression; Head injury; Known intolerance/Hypersensitivity to Fentanyl/Opioid; Known/suspected mechanical gastrointestinal obstruction; Suspected surgical abdomen (e.g. acute appendicitis).

Precautions: Use with caution in patients with lung disease or breathing difficulties.

Use with caution during pregnancy. Not recommended in nursing women and during labor and delivery, unless potential benefits outweigh the risks. MO/PA should be contacted.

Adverse Effects: Nausea; Constipation; Somnolence; Headache; Respiratory and central nervous system depression. NB: Peak respiratory depression may be seen as early as 15-30min from the start of oral administration and may persist for several hours.

Pharmacology: Onset of action (transmucosal): 5-15min. Time to peak effect: 20-40min (median).

Duration of action: Related to blood level.

Dosage and Administration:

- Place the unit in the mouth between the cheeks and gums. Medication is absorbed directly through the oral mucosa. Sucking or chewing on the product will increase how much medication is swallowed which will decrease efficacy.
- Move the unit around in the mouth, especially along the cheeks. Twirl the handle often.
- Finish the unit completely to get the most relief. If it is finished too early, more of the medicine will be swallowed and pain relief will be less effective.
- More than one unit may be required to control pain. Wait at least 15mins after finishing a unit completely before using another.
- Max dose: 2 (800µg) lozenges. Administer the second lozenge in the opposite buccal mucosa (opposite cheek)

7.14 Fluconazole (Diflucan)

Indication: Protocol 6.11 OTC Vaginal Candidiasis

Contraindications: Hypersensitivity to fluconazole

Precaution: Do not sue during pregnancy unless benefits outweigh the potential risk to the fetus as there is increased risk of spontaneous abortion and congenital abnormalities, particularly in the 1st trimester

Drug Interaction: ↑ benzodiazepine conc (midazolam); HCTZ ↑ fluconazole conc; Reports of QT Prolongation – Azole class effect – Review patient's current pharmacotherapy and comorbidities (cardiac) before supplying.

Adverse Reaction: Headache (12.9%); Nausea (6.7%); Abdominal pain (5.6%); Diarrhea (2.7%); Dyspepsia (1.3%); Dizziness (1.3%); Taste perversion (1.3%). Rarely, angioedema and anaphylactic reaction have been reported. (< 1%) Occasional allergic reactions including pruritus and urticaria.

Pharmacology: Inhibits fungal sterol synthesis which detrimentally alters the fungal cell membrane. Increased membrane permeability results in growth inhibition and cell death. T1/2 ~ 30hrs (range: 20-50hrs) after oral administration.

Dosage and Administration: 150 mg PO (one dose)

7.15 Fluorescein

Indication: Protocol 3.13 Eye Injury

Contraindication: Ruptured global injury.

Common Side Effects: local irritation on the eye, short-term blurry vision, stinging of the eye.

Precautions: Brief discoloration of skin if touched.

Dosage and Administration:

- Remove eyeglasses or contact lenses before the test.
- Instill drop(s) or touch the blotting paper to the outside corner of the surface of the eye.
- Ask the patient to blink. Blinking spreads the dye and coats the tear film covering the surface of the cornea. The tear film contains water, oil, and mucus to protect and lubricate the eye.
- Shine a blue light at the eye. Any problems on the surface of the cornea will be stained by the dye and appear green under the blue light.

7.16 Gastrolyte

Indication: Protocol 6.7 OTC Diarrhea

Contraindications: Severe renal disease.

Precaution: If patient's diarrhea does not improve in 1-2 days, or if it becomes worse, discuss with an SMA.

Adverse Reaction: Symptoms of too much sodium salt in the body: Convulsions; dizziness; fast heartbeat; high blood pressure; irritability; muscle twitching; restlessness; swelling of feet or lower legs; weakness.

Symptoms of too much fluid in the body: Puffy eyelids.

Dosage and Administration:

1. Add the entire contents of 1 sachet/packet to 200mL ounces of boiled, cooled tap water. Shake or stir the container for 2-3min until all the powder is dissolved.
2. Do not add more water to the solution after it is mixed.
3. Make and use a fresh solution each day.
4. The usual dose is 50-100mL per / kg of body weight taken over 4-6hrs.

7.17 Glucagon (Baqsimi)

Indications: Protocol 4.4 Hypoglycemic Protocol

Contraindications: Known allergy to glucagon; Pheochromocytoma (an adrenal tumor that can cause a sudden and marked increase in blood pressure).

Precautions: Glucagon may be less effective in presence of acute or chronic alcohol ingestion.

Adverse Effects: Nausea and vomiting, abdominal pain or discomfort

Pharmacology: Onset of action: IM: 10min. Duration: 35min. Time to maximal glucose concentration: 15min.

Dosage and Administration:

- Adult: 3 mg IN.
- Pediatric: 3 mg IN.

Glucagon is helpful in treating hypoglycemia only if sufficient liver glycogen is present. When the patient responds, give supplemental carbohydrate to restore the liver glycogen to prevent secondary hypoglycemia.

7.18 Hydrocortisone 1%

Indications: Protocol 6.10 OTC Atopic Dermatitis / Dry Skin

Contraindications: Known hypersensitivity to Hydrocortisone or to corticosteroids in general, to hydroxyquinolines, clioquinol, or other quinoline derivatives, to iodine, as well as to any other components of VIOFORM Hydrocortisone (clioquinol/Hydrocortisone) Viral infections of the skin (e.g., chicken pox, skin eruptions following vaccination, herpes simplex, herpes zoster), tuberculosis of the skin, syphilitic skin infections. Application to ulcerated areas. **Do not use in or around the eye**. **Do not apply to large areas.**

Precautions: If no improvement occurs within 1 week, therapy should be discontinued

Adverse Effects: Occasionally: signs of irritation such as burning sensation, itching or skin rash at the site of application; hypersensitivity reactions.

Dosage and Administration:

- Apply Hydrocortisone 1% to the affected area in a thin layer 2 times daily (BID).
- Use of Hydrocortisone under occlusive dressings is not recommended as the resulting humid conditions may promote secondary infections with non-sensitive organisms and may increase the possibility of elevated protein bound iodine (PBI)

7.19 Ibuprofen (Anti-inflammatory, Advil, Motrin)

Indication: Protocol 3.8 Pediatric Pain Protocol / 3.9 Adult Pain Protocol / 6.1 OTC URTI/ Protocol 6.2 OTC Pain Protocol / 6.3 OTC Headache/ Protocol 6.5 Dysmenorrhea

Contraindications: Not for use in the bleeding patient. Hypersensitivity to ASA, Ibuprofen, or other NSAIDs; GI ulcer; Bleeding; Active inflammatory bowel disease; Severe liver impairment; Severe kidney impairment; Hyperkalemia; Systemic lupus erythematous; Pregnancy.

Precaution: High blood pressure.

Adverse Effects: Nausea; Diarrhea; Epigastric pain; Abdominal cramps or pain; Heartburn; Bloating or flatulence; Dizziness; Headache; Nervousness; Rash; Pruritus; Tinnitus; Anemia; Decreased appetite; Edema; Fluid retention.

Pharmacology: Onset of action: Less than 1hr. Duration of action: 4-6hrs. Time to peak effect (oral dosing): 1-1.5hrs.

Dosage and Administration:

- Adult: Ibuprofen 800 mg PO q8hrs PRN (Max 2400 mg/day). OTC Pain/ OTC Headache/ OTC Dysmenorrhea/ dosing 400 mg q6-8hrs. PRN (max 1200 mg/day)
- Pediatric: Ibuprofen 10 mg/kg PO q8hrs PRN, not to exceed adult dose above.

7.20 Ketamine

Indication: Protocol 3.9 Adult Pain

Contraindication: Hypersensitivity to the drug.

Precautions: (Relative contraindications): Acute psychosis; cardiovascular disease; Increase in ocular

pressure. Resuscitative equipment should be ready for use. Respiratory depression or apnea may occur with over dosage or too rapid administration. Narcan does not antagonize ketamine analgesic effects.

Adverse Effects: Catalepsy: Bolus can cause transient decrease in ventilation; Diplopia; Nystagmus.

Tachycardia; Increase of blood pressure. Refer to Reference 8.20 Pain Management for other possible adverse effects.

Pharmacology: Onset of action: IM: 3-4 mins; IN: Less than 10min. Duration of action (of dissociation): IM: 15-30 mins; IN: Up to 60 mins.

Dosage and Administration:

- 50mg IM/IN with atomizer q30min PRN x 2 doses total.

For IM/IN Ketamine, use 50 mg/mL undiluted.

For IN route, split the 50 mg/mL in two (0.5 mL per nostril) to maximize the total mucosal

absorptive surface area by using both nostrils.

7.21 Lactated Ringer's (Ringer's Lactate) (LR / RL)

Indications: Protocol 1.5 Vital Signs Absent/ Protocol 3.7 Burn Management.

Contraindications: Newborn (≤ 28 days of age).

Precautions: Avoid use concurrent with blood transfusion. Avoid use of Lactated Ringer's (Hypotonic solution) with severe TBI whenever possible as it can exacerbate brain swelling.

Adverse Effects: Hypersensitivity/Infusion reaction.

Dosage and Administration:

- As per relevant Protocol

7.22 Loperamide (Imodium)

Indication: Protocol 6.7 OTC Diarrhea.

Contraindications: Patients with a known hypersensitivity to loperamide hydrochloride or any ingredients in the formula. Active inflammatory bowel disease. Pre-existing constipation or if one's abdomen is swollen or they have abdomen pain.

Precautions: Use only for control and symptomatic relief of diarrhea. Whenever underlying etiology for the diarrhea can be determined, use specific treatment whenever indicated or appropriate. Discontinue if clinical improvement of acute diarrhea does not occur within 48hours. Also discontinue if there is blood in the stool or if fever or abdominal distention develops.

Drug Interactions: Concomitant administration of loperamide with quinidine or ritonavir may increase loperamide plasma levels. Loperamide poses an intermediate risk to QT Prolongation. Beware of cumulative risk when combining with other QT prolongation agents (e.g. Fluconazole)

Adverse Reaction: Abdominal cramping and discomfort, drowsiness, dizziness, dry mouth, skin rash and constipation.

Pharmacology: Onset of action: < 1hr. Time to peak effect: approx. 5hrs. Duration of action: 8-12hrs

Dosage and Administration:

- **Adults and Pediatric Patients 13 Years and Older:** The initial dose is 4mg (two capsules) followed by 2mg (one capsule) after each unformed stool, orally. The maximum daily dose is 16mg (eight capsules) for up to 2 days. Clinical improvement is usually observed within 48 hours. Discontinue loperamide promptly if abdominal distention occurs.

7.23 Methoxyflurane (Penthrox)

Indications: Protocol 3.10 Penthrox Pain

Contraindications:

- Age<18
- Hypersensitivity to methoxyflurane, any fluorinated anesthetic
- History of severe adverse reactions with inhaled anesthetics
- Patients who are known to be or are genetically susceptible to malignant hyperthermia
- Kidney disease
- Altered level of consciousness
- Respiratory Depression
- Pregnancy or Lactating
- If patient must drive within the next 24hrs after receiving the medication.

Precautions: Caution in elderly

Adverse Effects: Euphoria, sedation, change in your ability to concentrate and to be coordinated, temporary memory problems, hypotension, respiratory depression.

Pharmacology: Onset of pain relief is rapid and occurs after inhalations or 5min with peak at 15 min. Continuous inhalation of a bottle containing 3 mL provides analgesic relief for up to 25-30 min, longer if intermittent use.

Dosage and Administration:

- Should be self-administered under supervision of a healthcare provider
- If patient requires stronger pain relief instruct to cover diluter hole
- Methoxyflurane 3 mL inhaled and exhaled through device (continuous or intermittent)
- Device provides ~ 20min of pain relief with continuous inhalation
- If pain ongoing >20min and Methoxyflurane effective administer 2nd inhaler
- Max 2 inhalers (6 mL) in 48hrs

7.24 Meloxicam

Indication: Protocol 3.9 Adult Pain

Contraindications: Known hypersensitivity; History of asthma; Urticaria or other allergic type reactions after taking aspirin or NSAIDs; Post coronary bypass graft (CABG).

Precautions: Meloxicam can increase the risk of fatal heart attack or stroke, especially if used for long term or taken in high doses. Avoid drinking alcohol as it increases the risk of GI bleeding. Pregnancy or breast-feeding.

Adverse Effects:

Cardiovascular thrombotic events; GI bleeding; Ulcerations and perforation; Hepatotoxicity; Hypertension; Heart failure and edema; Renal toxicity and hyperkalemia; Anaphylactic reactions; Serious skin reactions; Hematologic toxicity.

Pharmacology: Onset of action: PO <60min. Time to peak effect: 4-5hrs. Duration of action: 24hrs.

Dosage and Administration:

- 15 mg PO

7.25 Midazolam (Versed)

Indications: Protocol 5.3 Nerve Agent Exposure

Contraindications: Known hypersensitivity to midazolam or other benzodiazepines.

Precautions: May cause hypotension, particularly in pediatric patients or patients with hemodynamic instability. Hypotension may occur more frequently in patients who have received opioid analgesics. Use caution when administering to elderly or debilitated patients, children, and patients with liver disease or low serum albumin as they are more likely to experience CNS adverse effects.

Adverse Effects: The most common adverse effects are dose dependent CNS effects: Ataxia; Dizziness; Light-headedness; Drowsiness; Weakness and fatigue. The more serious, occasionally reported adverse effects are Hypersensitivity reactions; Mental depression; Behavioral problems; Paradoxical stimulant reactions; Leucopenia; Jaundice; Hypotension; Memory impairment; Phlebitis or Venous thrombosis; and Seizures.

Dosage:

- Autoinjector as directed by Medical Officer / Task Force Surgeon

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7.26 Moxifloxacin (Avelox - Antibiotic)

Indications: Protocol 3.13 Eye Injury/ Protocol 4.2 Antibiotic

Contraindications: Patients who are hypersensitive to Moxifloxacin hydrochloride or other quinolone antibacterial agents.

Precautions: Serious hypersensitivity and or anaphylactic reactions have been reported in patients receiving quinolone therapy, see anaphylaxis protocol 2.3 / 2.4. Seizures may occur with quinolone therapy. Moxifloxacin should be used with precaution in patients with known or suspected CNS disorders which may predispose to seizures or lower the seizure threshold. Administration of an NSAID with a quinolone may increase the risk of CNS stimulation and convulsions.

Adverse Effects: Most common adverse reactions are abdominal pain, headache, nausea, diarrhea, vomiting.

Dosage and Administration:

- Recommended dose for Moxifloxacin tablets is 400 mg once daily for all indications.

7.27 Naloxone (Narcan – Narcotic antagonist)

Indications: Protocol 4.1 Suspected Narcotic Overdose / Protocol 4.6 Unconscious NYD

Contraindication: Hypersensitivity to Naloxone.

Precautions: Naloxone may have a half-life as short as 30min. In the case of narcotic overdose, the patient should be closely observed for a change in mental state (agitation, combativeness, etc.). The patient may require further Naloxone if the underlying problem is narcotic overdose.

Pharmacology: Onset of action: IM: 2-5min; IN: 8-13min. Duration of action: variable, but usually 1hr or less. Half-life: approx. 1hr.

Dosage and Administration:

- **Adults**: 0.4 mg IM q3min PRN maximum dose of 5mg (discuss with SMA ASAP), 4mg/ml q3min PRN (alternating nostrils) maximum 5 doses (discuss with SMA ASAP) (available as Narcan nasal spray 4mg/0.1mL)
- **Children**: 0.01 mg/kg IM (after discussion with SMA) q3min up to 0.4 mg per dose.

  Massage site after SC injection.

7.28 Nitroglycerin (Nitroglycerin Spray)

Indications: Protocol 1.1 Suspected Cardiac Chest Pain

Contraindications: Hypersensitivity and severe hypotension. Due to hemodynamic concerns, nitrates of any kind should not be used with the following timeframes. Not within 24hrs of Viagra (Sildenafil), not within 48hrs of Cialis (Tadalafil), and not within 24hrs of Levitra (Vardenafil).

Precautions: Watch for hypotension. Monitor BP q5-10min

Pharmacology: Onset of action; Sublingual spray: 1-2min. Peak effect: 4-10min. Duration of action: 30-60min.

Adverse Effects: Hypotension, headache, fainting, dizziness, weakness, and face flushing, burning sensation of the tongue.

Dosage:

- Assist patient with already prescribed Nitroglycerin spray 0.4 mg q5min (max 3 doses)

7.29 Normal Saline (Crystalloid, NS, 0.9% Sodium Chloride)

Indications: Protocols requiring IV/IO Access

Contraindications: Pulmonary edema

Maintenance Rates (unless otherwise specified):

- **Adults**: 100 mL/hr.
- **Children**: See Pediatric Table 8.38 for maintenance rates and other pediatric indications

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7.30 Obidoxime

(Not licensed in Canada, but CAF has access to DOUBLEPEN Obidoxime/Atropine (OA) through Health Canada's Special Access Program)

Indication: Protocol 5.3 Nerve Agent Exposure

Contraindications: There are no absolute contraindication due to the life-threatening nature of nerve agent poisoning.

Precautions: Serious kidney and/or liver disease; Allergy to any of the ingredients in DOUBLEPEN OA.

Adverse Effects: Possible side effects for Obidoxime include: Uncommon liver and kidney disturbances; Heart arrhythmias; Sensations of heat or cold; Taste of menthol; Numbness; Muscle weakness; Dry mouth; Slight increase in heart rate and blood pressure. Svcs Ops is responsible for maintaining a nominal roll of all personnel who use or are administered this product and any adverse events. **IT IS THEREFORE IMPORTANT TO REPORT ANY SIDE EFFECTS TO YOUR MEDICAL OFFICER.**

Pharmacology: Onset of action: Within 15min of injection.

Dosage and Administration:

- For Moderate to Severe Symptoms of Nerve Agent Poisoning:
    - Inject one (1) DOUBLEPEN OA immediately and one (1) anti-convulsant auto-injector immediately afterwards.
    - Wait fifteen (15) minutes for antidote to take effect.
    - If symptoms are still present, inject a second DOUBLEPEN OA.
    - If symptoms are still present after another fifteen (15) minutes, inject a third DOUBLEPEN OA.
    - Do not exceed 3 DOUBLEPEN OA.
- DOUBLEPEN OA:
    - Used for self-injection or buddy-administration.
    - For intramuscular injection as an auto-injector.
    - Content of the two-chamber auto-injector:
        - 1st chamber – Obidoxime Dichloride - 220mg/2mL
        - 2nd chamber – Atropine Sulphate - 2mg/2mL
- Administration procedure:
    - Move excess clothing out of the way to minimize its thickness around the injection site.
    - Inject one (1) DOUBLEPEN OA by removing the cotter pin near the top, placing the auto-injector on mid outer thigh halfway between hip and knee, ensuring your thumb is over the button on the opposite side where the pin was and pushing the button firmly. Hold for ten (10) seconds.
    - Place used DOUBLEPEN OA and anti-convulsant auto-injector in the casualty's Mask Carrier Bag.
    - Seek medical attention for casualty and provide information on whether contamination is suspected in the area, the number of injections used, whether artificial respiration was applied, and other injuries and treatments used.

7.31 Oxygen (O_2)

Indications: All Protocol

Contraindications: Nil

Precautions: Caution in those patients with COPD, as it may depress respiratory drive. These patients require frequent monitoring. Be prepared to assist ventilation if required.

Dosage and Administration:

- As per protocol.
- As required to achieve/maintain target SPO_2/O_2 saturation.

7.32 PEG-3350

Indications: Protocol 6.8 OTC Constipation

Contraindications: Hypersensitivity to Peg or to any ingredient in the formulation. Bowel perforation, gastrointestinal obstruction and gastric retention.

Precautions: Use of Peg is not recommended when patient presents with abdominal pain, nausea, or vomiting. A laxative should not be taken within 2 hours of another medicine because the desired effect of the other medicine may be reduced.

Adverse Reaction: The adverse reactions occurring with Peg products used in the treatment of constipation include: nausea, abdominal bloating, cramping, diarrhea and/or gas. High doses may produce diarrhea and excessive stool frequency, particularly in elderly patients.

Pharmacology: Onset: 1-2hr after ingestion

Dosage and Administration:

- Dissolve the entire contents of one sachet (70 g) in 250mL of water and stir rapidly to dissolve. Patients should be instructed not to add any other ingredient (such as flavors, juice, etc.) than the recommended quantity of water. Refrigerate the solution as chilling improves the taste. Using a straw can help to make the solution more palatable and easier to drink.

7.33 Pseudoephedrine (Sudafed)

Indications: Protocol 6.1 OTC URTI

Contraindications: Uncontrolled high blood pressure or asthma, heart disease, glaucoma, diabetes, an overactive thyroid gland, or difficulty urinating (due to an enlarged prostate gland). Use of an MAO Inhibitor (i.e., Phenelzine, Tranylcypromine, Selegiline) in the last 2 weeks.

Precautions: To prevent trouble sleeping, take the last dose of the day several hours before bedtime.

Caffeine-containing beverages (coffee, tea, and cola) may increase the restlessness and insomnia caused by pseudoephedrine in sensitive individuals, so you may wish to reduce your consumption of these beverages.

This medication is found in many over the counter cold/flu, and seasonal allergy remedies. Be very careful when combining these or any medications to avoid an overdose. If symptoms do not improve after 5 days or are accompanied by a high fever, seek medical attention.

Side Effects: The most common side effects are dry mouth, dry skin, itching, rash, blurred vision, ringing in the ears, drowsiness. Nervousness, excitability, restlessness, dizziness, headache, weakness, insomnia, nausea, vomiting. Difficulty urinating, trouble breathing, fast heartbeat, palpitations, tremors, hallucinations, pain or burning during urination.

Pharmacology: Onset**:** Usually begins to work within 30min**;** Duration: 4-6hrs

Dosage and Administration: Dosage 1 tabs (60mg) every 6 to 8hr PO. **Do not take more** than 4 tablets in 24hr.

7.34 Salbutamol (Ventolin)

Indications: Protocol 2.2 SOB Suggestive of Asthma/COPD (Adult) / Protocol 2.3 Anaphylaxis/Anaphylactic Shock – Adult & Children ≤ 30kg / Protocol 2.4 Anaphylaxis/Anaphylactic Shock – Adult & Children > 30kg.

Contraindication: Hypersensitivity to salbutamol.

Adverse Effects: Palpitations; Tachycardia; Nervousness; Headache; Tremor; Paradoxical bronchospasm (breathing worsen). *If paradoxical bronchospasm occurs, discontinue administration immediately and contact MO/PA*

Pharmacology: Onset of action: 5-15min before measurable decrease in airway resistance; Duration of action: 3-6hrs. Time to peak effect: MDI: 60-90min.

Dosage and Administration: (Shake the puffer well and prime the device before giving dose)/ Administration with a spacer (can be improvised) is preferred.

- SOB Suggestive of Asthma/COPD (Adult)
    - Mild/Moderate: 4-8 puffs MDI q20min PRN x 3 doses
    - The doses can be repeated for another 3 doses (6 doses total max) if improvement noted. If no improvement, contact MO/PA.
    - Severe/Near Death: 2 puffs MDI q1min or continuous salbutamol via nebulizer.
- Anaphylaxis/Anaphylactic Shock – Adult & Children > 30kg
    - 4-8 puffs MDI q20min PRN;
- Anaphylaxis/Anaphylactic Shock – Adult & Children ≤ 30kg
    - 2 puffs MDI q20min PRN;

7.35 Tetracaine (Minims Tetracaine Hydrochloride 0.5% & 1.0%, Eye drops solution)

Indication: Protocol 3.13 Eye Injury

Contraindication: Severe allergy (anaphylaxis) to other anesthetics.

Precautions: Consult physician if:

- Patient is a premature baby
- If patient is taking a sulfonamide for diabetic treatment (Gliclazide, Glyburide); for a bacterial infection (Septra); for diuresis (Hydrochlorothiazide, furosemide, indapamide, acetazolamide); for migraines (sumatriptan, other triptans).
- The cornea may be damaged by prolonged application of anesthetic eye drops

Adverse Effects: Transient blurring of vision, burning sensation, itching around the eye, corneal damage with prolonged application.

Dosage and Administration:

- **Adults and children** – one drop or as required.
- Each unit should be discarded after use. Store in the original package to protect from light, at room temperature.

7.36 Tranexamic Acid (Antifibrinolytic)

Indication: Protocol 3.4 Hemorrhagic Shock

Contraindications: Deep Vein Thrombosis (DVT); Pulmonary embolism; Cerebral thrombosis; Hypersensitivity to ingredients; Hematuria.

Precaution: No evidence for use in patients under 18 years of age

Adverse Effects: Dizziness; Nausea; Vomiting; Diarrhea; Reduced blood pressure; Allergic dermatitis; Impaired colour vision.

Pharmacology: TXA promotes clot formation by inhibiting plasminogen from binding to fibrin, which decreases plasmin activation and breakdown of fibrin in clot formation.

Dosage and Administration:

- Administer 2g of tranexamic acid via slow IV or IO push as soon as possible but **NOT** later than 3 hours after injury.
- Maximum Dose: 2g (20 mL)

7.37 Xylocaine 1% without Epinephrine (Lidocaine without Epinephrine)

Indications: Protocol 4.2 Antibiotic

Contraindications: History of hypersensitivity reaction to other anesthetics

Precautions: Maximum lidocaine to be used 3.2mL

Adverse Effects: Depends on dosage, concentration, and rate/method of administration.

Most common: Bradycardia; Hypotension; Nausea, vomiting, diarrhea CNS depression (Dizziness; Confusion; Light-headedness; Euphoria); Allergic reactions (Cutaneous lesions; Urticarial; Edema; Anaphylactic); Headache; Backache; Double vision.

Dosage and Administration:

- Concentration/dosage:
    - Reconstitution lidocaine 1% **without** epi:10mg/mL, mix 3.2 mL with 1g of Ertapenem.
        - Adult 1g once every 24hrs.
        - Children (3 months – 12yrs old): 15 mg/kg, IM q12hrs. (BID), max 500g per dose.

SECTION 8

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8.1 MIST-AT

PREFIX	DESCRIPTION / NOTES	MESSAGE CONTENT		
	Call Sign To / From			
	Warning Order	MISTAT		
	Casualty Identity (Zap) DO NOT SEND IN CLEAR (Note 1)			
M	**Mechanism of Injury** How did the casualty get injured? Gunshot wound; Explosion; MVC; etc.			
I	**Injury or Illness Sustained** What are the injuries or illnesses sustained? Describe the nature and location of each injury, possible, starting with the most severe.			
S	**Symptoms and Vital Signs** C – Catastrophic Bleed A – Airway B – Breathing Rate C – Pulse Rate / Location D – LOC E – Other Signs	Time:_____ C_____ A_____ B_____ C_____ D_____ E_____	Time:_____ C_____ A_____ B_____ C_____ D_____ E_____	Time:_____ C_____ A_____ B_____ C_____ D_____ E_____
T	**Treatment Given** Describe the treatment given. GIVE TIME Morphine administered as written on the casualty; Tourniquet; Fluids; Haemostasis.			
A	**Age of Casualty**			
T	**Time of Wounding**			

Note:

1. A casualties identify is not sent in clear. Each soldier should have an identification code (or "ZAP" number). If the casualty is a local national, some means of differentiating casualties should be used e.g. Casualty #1.

8.2 Tourniquet Assessment, Replacement or Conversion

During M.A.R.C.H.E (B-I-F-T):

- Reassess prior Tourniquet (TQ) applications. Expose wound and determine if a TQ is needed based on wound characteristics and patient's clinical condition.
- Every effort should be made to convert a TQ in less than 2 hours if bleeding can be controlled by other means.

Conditions under which a Limb TQ may be considered for Conversion/Removal:

- Effective hemorrhage control can be continuously maintained by other means, such as direct pressure, wound packing, hemostatic dressing and pressure dressing.
- To replace a strap style TQ (CAT, SOFTT-W) with a pneumatic TQ when there is minimal risk of puncture.
- To replace a TQ that was placed over clothing during CUF.

Contraindications for conversion of a TQ to a recommended hemostatic dressing and/or pressure dressing:

- Complete amputation.
- Patient is in hemorrhagic shock or has decreased LOC presumed secondary to hemorrhagic shock.
- The TQ has been on for ≥ 4 hours.
- If you cannot monitor the limb continuously for re-bleeding.
- Bleeding cannot be controlled by other means.

Conversion of a TQ placed over the clothing to a TQ placed on skin:

- There are two possibilities for a TQ that was placed over clothing (CUF):
    1. Clearly proximal to a bleeding site that was visualized.
    2. "High and Tight" (as proximal as possible on the injured limb) where a bleeding site was not able to be visualized.

TQ applied clearly proximal to a bleeding site:

1. Cut away the clothing above and proximal to the initial TQ;
2. Apply a 2nd TQ (ideally pneumatic) immediately above the initial TQ, directly on skin;
3. Then slowly loosen the initial TQ (over the clothing) while monitoring for rebleeding;
4. If at any point bleeding restarts, retighten the initial TQ, verify proper application of the new TQ and consider reattempting conversion one final time. If a serial attempt results in rebleeding, secure and retain the initial TQ;
5. If there is no rebleeding, confirm elimination of distal pulse and remove the initial TQ;
6. Document all changes including conversion time and keep the initial TQ (CUF) application time;
7. Prior to any movement of a patient where a limb TQ has been applied, the limb should be immobilized where tactically feasible to preserve the effectiveness of the TQ (do not delay evacuation).

TQ applied High & Tight

1. Cut away the clothing distal to the TQ;
2. Apply a 2nd TQ (ideally pneumatic) 2-3 fingers above the wound, directly on the skin;
3. Slowly loosen the initial TQ (over the clothing) while monitoring for rebleeding;
4. If at any point bleeding restarts, move the initial TQ (on clothing) side by side with the new TQ (on skin) and retighten;
5. Verify proper application of the new TQ and consider reattempting conversion one final time. If a serial attempt results in rebleeding, secure and retain the initial TQ; f. If there is no rebleeding, confirm elimination of distal pulse and remove the initial TQ;
6. Document all changes including conversion time and keeping the initial TQ (CUF) application time;
7. Prior to any movement of a patient where a limb TQ has been applied, the limb should be immobilized where tactically feasible to preserve the effectiveness of the TQ (do not delay evacuation).

Conversion of a strap style TQ (placed on the skin) to a pneumatic TQ (EMT):

- Apply a pneumatic TQ immediately above the initial TQ (strap style).
- Then slowly loosen the initial TQ (close to the wound TQ) while monitoring for rebleeding.
- If at any point bleeding restarts, retighten the initial TQ.
- Verify proper application of the new TQ and consider reattempting conversion one final time. If a serial attempt results in rebleeding, secure and retain the initial TQ.
- If there is no rebleeding, confirm elimination of distal pulse and remove the initial TQ.
- Document all changes including conversion time and keeping the initial TQ (CUF) application time.
- Prior to any movement of a patient where a limb TQ has been applied, the limb should be immobilized where tactically feasible to preserve the effectiveness of the TQ (do not delay evacuation).

Notes:

Do not periodically loosen a TQ to permit blood circulation. When a TQ is loosened, creatine kinase, lactic acid, myoglobin, potassium and other anaerobic and cellular death by-products in the limb are released into central circulation. Therefore, the longer the TQ has been in place, the higher the risk of a reperfusion injury (e.g. cardiac arrest, kidney failure).

A TQ requires sufficiently intact/stable underlying bone structure to be effective. In cases where the underlying skeletal structure has been significantly compromised (e.g. complex blast trauma, mangled extremity), The Combat Medic may need to apply the TQ very proximal ("High and Tight").

Conversion of a TQ to a Hemostatic dressing (Combat Gauze):

- Every effort should be made to convert a TQ in less than 2hrs if bleeding can be controlled by other means.
- The goal of wound packing is to replace the free space caused by wound cavitation or tissue displacement/injury. When applied tightly, it can provide the pressure required to help establish homeostasis.
- A limb TQ should be converted to other hemorrhage control means (e.g. packing with hemostatic dressing/gauze, pressure dressing, etc.) as soon as possible if the following 3 criteria are met:
    1. Patient is not in shock or no decreased level of consciousness secondary to hemorrhagic shock;
    2. Effective hemorrhage control can be continuously maintained until arrival at the medical treatment facility;
    3. The TQ is not being used to control bleeding from an amputated extremity.

Packing Procedure:

1. Expose and assess the wound (swipe the wound to remove any debris or blood clots).
2. Prepare/Remove the gauze from the sterile package.
3. Slowly loosen the TQ to locate the source of bleeding through digital exploration of the wound ("Feel the Bleed").
4. Make a small ball with the end of the gauze. While maintaining continuous finger pressure, feed the gauze under your finger, packing the wound toward the source of the bleeding[1].
5. Pack the entire wound cavity and fill it tightly with an approved hemostatic gauze[2]. Make sure that no air pockets are created as you pack. Overfill the cavity (this helps to transmit surface pressure to the source of the bleeding within the wound).
6. Release the TQ.
7. Maintain direct pressure for 5 minutes[3,4].
8. Monitor for rebleeding/packing ineffectiveness (soaking through) and be prepared to retighten the TQ[5].
9. If packing is successful, apply a pressure dressing directly over the wound to continue maintaining pressure.
10. If at any point, in the opinion of the Combat Medic, the rate of blood loss is too significant to attempt packing, retighten the initial TQ.
11. Document all changes including conversion time and keeping the initial TQ (CUF) application time.
12. Prior to any movement of a patient where a limb TQ has been applied, the limb should be immobilized where tactically feasible to preserve the effectiveness of the TQ (do not delay evacuation).

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1. Occlusion through compression of the blood vessel against anatomical structures (e.g. bones).
2. If no hemostatic agents are available, use regular gauze or clean fabric to pack the wound.
3. Disregard Combat Gauze manufacturer's instructions (3 minutes) and use proper technique (apply pressure with both hands, locked elbows and own body weight squared on top of wound).
4. If hemostatic dressing is not available, use plain gauze and maintain pressure for 10min. If a packing attempt fails, where it is expected to have been conducted under ideal conditions (with the aid of an effective TQ), the Combat Medic should generally error on the side of treating the wound/bleed as one that CANNOT be controlled by other means. A serial re-packing should only be attempted if there is a known/suspected reason for the first packing failure (too loose, direct pressure not long enough, etc).

General information:

Signs of TQ effectiveness:

- Bleeding stops and no distal pulse (if applicable).
- Bleeding from bone marrow is normal and not indicative of TQ ineffectiveness. Slow bleeding from the marrow should be controlled with dressing and elevation following management of life-threatening injuries.

Common mistakes:

- Pain doesn't mean that the TQ is effective.
- Install a TQ and forget it; a TQ needs constant monitoring in case of rebleeding.
- TQ placed over a joint/articulation.
- When installing the TQ, not wrapping the main strap completely around the limb and securing it in the rod locking clip.

Reasons why TQs can become ineffectiveness:

- Limb was not immobilized before moving the patient.
- Limb/TQ was not closely monitored during treatment/transport.
- TQ was not secured properly during application.

Venous TQ INCREASES bleeding:

- Persistent distal arterial flow and continual blood loss.
- Distal venous distension, engorgement, venous hypertension.
- Distal blood pooling, expanding wound hematomas.
- Loss of fluid from plasma into tissues distally and distal limb swelling and edema.
- Increased pressure in distal tissues risking compartment syndrome, ischemia, necrosis and requiring fasciotomy.
- Continued hemorrhage often paradoxically worse than with no TQ and may be difficult to control.

TQ and Limb temperature:

- Keep the limb distal to the TQ cool but protect from freezing and keep the remainder of the body warm.
- There is no risk of hypothermia from cooling the limb because the cold blood is not returning to the core.
- A cool extremity improves limb survival as the lower temperature slows the cellular metabolism within the limb reducing lactic acid production. Thus, it mitigates a reperfusion injury. It also decreases clotting in the limb.
- **It is more important to warm the body than it is to cool the limb.**
- Place the limb outside of any blankets if able. This also allows monitoring for rebleeding.

8.3 Assessing and Treating Hemorrhage

There are six potential sites for massive hemorrhage:

1. External (visible)
2. Thoracic Cavity
3. Abdominal Cavity
4. Retroperitoneal Space
5. Pelvic Fractures
6. Extremity (Long Bone fracture)

However, only external hemorrhage is amenable to compression in the field. Therefore, massive compressible hemorrhage will always **refer to treating identified massive "external bleeding**."

The definition of massive compressible hemorrhage is the presence of ongoing external bleeding from a wound that is of significant rate, in the opinion of the Combat Medic, enough to compromise the hemodynamic status of the patient immediately or in the near future, if left untreated.

The Combat Medic typically operates in a dynamic environment, where changing conditions will dictate the most appropriate care provided to the patient. Accordingly, they must be prepared to adapt their clinical approach in managing hemorrhage to the changing situation (e.g. CUF/Threat, TFC).

Obvious Massive External Hemorrhage or Traumatic Amputation

Direct/Indirect pressure

- In Care Under Fire/Threat, apply direct or indirect pressure with hand or knee/shin until you access equipment. Knee pads interfere with appropriate application of direct pressure.
- In Tactical Field Care, apply direct pressure with two digits directly on the damaged vessel and/or indirect pressure to a pressure point proximal to the wound with heel of hand, knee or elbow.

If Amenable to a Limb TQ

- Description
  - Any bleeding from the arms or legs that occurs from a wound distal enough from the inguinal or axillary area to allow proximal control of the bleeding with TQ placement. Only use an issued recommended limb TQ:
    a. Windlass TQ
       i. Combat Application Tourniquet (CAT)
       ii. SOF Tactical Tourniquet-Wide (SOFTT-W)
    b. Pneumatic TQ
       i. Emergency and Military Tourniquet (EMT)
  - Amputation: No distinction has to be made between arterial or venous bleeding. The TQ is placed on the limb as close to the wound as possible (generally 2 to 3 fingers width above the level of the amputation, but not over a joint; directly on the skin) and tightened until the bleeding stops. Bleeding from bone marrow is normal and not indicative of TQ ineffectiveness. Slow bleeding from the marrow should be controlled with dressing and elevation following assessment and management of life-threatening injuries (M.A.R.**C**.H.**E**.).
  - TQ applied on an amputated limb should not be removed. A pelvic binder should be applied before moving a patient with a lower limb amputation secondary to a blast. If tactically feasible, clean the amputated part by gentle rinsing with RL or NS solution. Wrap the part in sterile gauze moistened with RL or NS solution and place it in a plastic bag/container. After labeling the bag/container, place it in an outer container filled with crushed ice. Do not freeze the part by placing it directly on the ice or by adding another coolant such as a dry ice. Keep out of sight of the victim.
  - A tourniquet requires sufficiently intact/stable underlying bone structure to be effective. In cases where the underlying skeletal structure has been significantly compromised (e.g. complex blast trauma, mangled extremity), the Combat Medic may need to apply the TQ very proximal ("High and Tight").
  - Limb preserved: A TQ should be applied, when anatomically amenable, for the initial management of all life-threatening hemorrhage. Assessment, Replacement or Conversion occurring later (Protocol 3.2 and Procedure 8.2).

1. Non-Obvious Massive External Hemorrhage In the absence of an Obvious Massive External Hemorrhage or after controlling an Obvious Massive External hemorrhage, the assessment should start at the inguinal region, both legs, the neck, axillae and then both arms

Care Under Fire/Threat

- Apply the Combat Application Tourniquet (CAT) over clothing clearly proximal to the bleeding site(s). If the hemorrhage location is readily apparent, apply the TQ 2 to 3 fingers width above the wound, but not over a joint. If the site of the **life-threatening bleeding is not readily apparent, place the tourniquet "High and Tight" (as proximal as possible) on the injured limb.**

CAT application procedure:

1. Proceed with aggressive initial tightening of the strap, removing all slack.
2. Twist the rod until bleeding has stopped and loss of distal pulse.
3. Secure the rod inside a clip to lock it in place.
4. Route the band between the clips and over the rod. Secure rod and band with TIME strap. Record time of application.
5. If bleeding continues or restarts at any time, verify correct application of the 1st TQ and consider applying a 2nd TQ directly above (proximal to) the first. Based on the tactical situation, the Combat Medic may choose to proceed directly to a "High and Tight" (as proximal as possible) TQ. If the initial TQ was applied High and Tight, apply a 2nd TQ directly below (distal).
6. If two TQs are ineffective and are distal to the knee or elbow joints, apply a 3rd TQ mid-thigh or above the elbow.
7. Mark TQ application time on patient tag/forehead/device (e.g., TQ 2230hrs).

Tactical Field Care

- Visually assess the patient. Cut & Expose the wound/bleeding site.
- If TQ installed in Care Under Fire/Threat, assess its effectiveness.
- For newly identified or previously uncontrolled hemorrhage, a SOF Tactical Tourniquet-Wide (SOFTTW) or an Emergency Medical Tourniquet (EMT) 1 is preferred.
- Apply TQ on extremity:
    1. Directly on the skin; 2-3 fingers width above the wound; not over a joint; and at least 5cm above the medial femoral condyle to avoid the adductor hiatus.
    2. Twist rod or pump air into EMT until bleeding has stopped and distal pulse is eliminated.
    3. If at any given time bleeding is still active, reassess 1st TQ and consider applying a 2nd TQ directly above (proximal to) the first TQ.
    4. If two TQs are ineffective and are distal to the knee or elbow joints, apply a 3rd TQ mid-thigh or above the elbow
    5. Mark TQ application time on patient tag/forehead/device (e.g., TQ 2230hrs).
    6. Reassess frequent[1]
- **N.B**: In TFC and TACEVAC Phases of Care: Prior to any movement of a patient where a limb TQ has been applied, the limb should be immobilized where tactically feasible to preserve the effectiveness of the TQ (do not delay evacuation)

1. The SOFTT-W or the EMT are the preferred options in TFC, but for the patient's comfort and to reduce tissue damage, the EMT is considered the most ideal (if available and safe to utilize).

If NOT Amenable to a Limb TQ (or Limb TQs have failed)

Care Under Fire/Threat

- Apply direct or indirect pressure with hand or knee if tactically feasible.

Tactical Field Care

- Pack Wound with Hemostatic Dressing.

**Important: Packing should not be done on wound in the abdominal, thoracic or cranial cavity.

Packing procedure:

1. Apply pressure with two digits (if possible) directly on the damaged vessel; and/or indirect pressure to a pressure point proximal to the wound with heel of hand, knee or elbow.
2. Expose and assess the wound (swipe the wound to remove any debris or blood clots).
3. Prepare/Remove the gauze from the sterile package.
4. Slowly remove the direct or indirect pressure to locate the source of bleeding through digital exploration of the wound ("Feel the Bleed").
5. Make a small ball with the end of the gauze. While maintaining continuous finger pressure, feed the gauze under your finger, packing the wound toward the source of the bleeding[2]. Simultaneous indirect pressure is preferred if feasible.
6. Pack the entire wound cavity and fill it tightly with an approved hemostatic gauze[3]. Make sure that no air pockets are created as you pack. Overfill the cavity (this helps to transmit surface pressure to the source of the bleeding within the wound).
7. Maintain direct pressure for 5 minutes[4,5,6].
8. If packing successful, apply a pressure dressing directly over the wound to continue maintaining pressure.
9. If at any point it can't be controlled by any means, in the opinion of the Combat Medic, the rate of blood loss is too significant to attempt packing, consider a TQ application and contact SMA,

If Amenable to a Junctional TQ (or for extremity hemorrhage where other hemorrhage control measures have failed)

Junctional hemorrhage is compressible hemorrhage from the groin proximal to the inguinal ligament, the buttocks, the gluteal and pelvic area, the perineum, the axilla and the shoulder girdle and the base of the neck. Junctional hemorrhage also includes extremity bleeding from sites too proximal for effective use of extremity TQs.

If the bleeding site is amenable to use of a junctional TQ (inguinal region only), immediately apply a recommended junctional TQ. Do not delay in the application of the junctional TQ once it is ready for use. Apply hemostatic dressings with direct pressure if a junctional TQ is not available or while the junctional TQ is being readied for use. A junctional TQ may also be applied for lower extremity hemorrhage that has not be controlled by other means (as an indirect hemorrhage control device).

- **Packing alone should be used in junctional hemorrhage from the axillary region.**

1. Vigilantly in the first 10 minutes of application to account for muscle relaxation and subsequent bleeding; during and after patient movement; and after any period where the patient was left unmonitored.
2. Occlusion through compression of the blood vessel against anatomical structures (i.e.: bones).
3. If no hemostatic agents are available, use regular gauze or clean fabric to pack the wound.
4. Disregard Combat Gauze manufacturer's instructions (3 minutes) and use proper technique (apply pressure with both hands, locked elbows and own body weight squared on top of wound).
5. If hemostatic dressing is not available, use plain gauze and maintain pressure for 10min.
6. If hemostatic dressing fails to control bleeding after adequate pressure, remove hemostatic dressing and attempt a 2nd application with a new hemostatic dressing. If a 2nd packing attempt fails, apply a TQ.

8.4 SAM® Junctional Tourniquet Application (only inguinal region)

Procedure:

1. Slide the belt underneath the patient, positioning the Target Compression Device (TCD) over the area to be compressed. Use sterile gauze or hemostatic dressing if targeting directly over a wound. For bilateral application, use a second TCD.
2. Hold the TCD in place and connect the belt using the buckle.
3. Pull the BROWN HANDLES away from each other until the buckle secures. You will hear an audible click. Fasten excess belt in place by pressing it down on the Velcro. You may hear a second click once the belt is secure.
4. Use the hand pump to inflate the TCD until hemorrhage stops.
5. **Secure the patient's feet (using a figure 8 knot).**
6. Monitor patient during movement/transport for hemorrhage control and adjust the device if necessary.
7. TO REMOVE: Unbuckle the belt[1]

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1. WARNING: SAM® Junctional Tourniquet is intended to be left for up to four hours. Remove only at a Definitive Care Facility. Additional hand pumps may be necessary with changes in altitude. If altitude change is a concern, a syringe can be used to fill the TCD with water, saline, or other non-compressible fluid.

Suspected Pelvic Fracture

1. Description/Assessment

- Blood loss is the leading cause of death in patients with pelvic fractures (PHTLS). Because the pelvis is a strong bone and difficult to fracture, patients with pelvic fractures frequently have associated injuries.
- Examples of pelvic fractures include: Rami fractures (typically not associated with significant internal hemorrhage); Acetabular fractures (may be associated with significant internal hemorrhage); and Pelvic ring fractures (can lead to a life-threatening hemorrhage).
- Fractures of the pelvic ring are typically classified into three categories:
  - Lateral compression fractures (60-70% frequency).
  - Anterior-posterior compressing fractures aka open book (15-20% frequency).
  - Vertical shear fractures (5-15% frequency).
- The identification of a pelvic fracture in a prehospital environment is challenging and should not solely rely on the assessment of the pelvic ring (see Indications below). Strategies to identify pelvic fracture in the prehospital environment include identification of risk factors and signs/symptoms. Physical examination findings, in general, are not sensitive for identification of pelvic fracture. Accordingly, the Combat Med should first evaluate the presence of any indications for Pelvic Binder (below), prior to physical examination. The presence of any one indication negates the requirement to perform further evaluation of the pelvis, and a binder is required prior to movement of the patient.
- If necessary, the pelvis should only be evaluated once by a SMA. Pelvic "springing" as an assessment technique is a poor predictor of the presence or absence of pelvic fracture. Examination should start with gentle palpation and progress to gentle manual pressure anterior to posterior and from the sides. This pressure may identify crepitus or instability, and any discomfort/tenderness is a positive indication for pelvic binder application.
- The Combat Medic should, in a suspected pelvic fracture, use a pelvic binder or any other pelvic splint to stabilize unstable pelvic fractures; close a disrupted pelvic ring; and decrease the volume of the pelvis thus preventing more damage to the surrounding structures and reducing potential hemorrhage.
- Another challenge is the movement of a patient with a pelvic fracture. Movement or logroll can shift bone fragments even with a splint applied (especially Lateral compression fractures and Vertical shear fractures). The best way to move a patient with a suspected pelvic fracture may be with a scoop stretcher or by a direct patient lift while maintaining spine immobilization and placement onto a long backboard. For assessment, treatment or positioning purposes, a maximum logroll of approximately 15° can be performed.

2. Indications

- Penetrating or blunt pelvic trauma.
- Unexplained hypotension in suspected or known blunt or blast trauma.
- Blast injury with lower limb amputation or partial amputation.
- Complaints of pelvic pain or tenderness on examination.

Splints for suspected pelvic fracture must be applied prior to moving the patient)

8.5 SAM® Junctional Tourniquet Application

Procedure:

1. Carefully put patient in supine position with device's belt located under the pelvis.
2. The lower extremities should be adducted and internally rotated.
3. Align the center of the device's belt with the greater trochanters.
4. Slowly draw tension (creating simultaneous circumferential compression) and secure the device, in accordance with the manufacturer's recommendations.
5. Complete splinting of the extremities with padding between legs (if tactically feasible) and secure the victim's feet (using a figure 8 knot) if not done already.
6. Record the date and time of application.

8.6 Arrow® T-POD™ Pelvic Stabilization Device Application

Procedure:

1. Carefully put patient in supine position with device's belt located under the pelvis.
2. The lower extremities should be adducted and internally rotated.
3. Align the center of the device with the greater trochanters.
4. Wrap T-Pod around patient's pelvis & cut the exceeding T-Pod belt leaving a 6–8inch gap of exposed pelvis (the T-Pod is 8" wide, use it has a reference).
5. Apply tightening apparatus.
6. Slowly tighten T-Pod until stabilization is achieved.
7. Complete splinting of the extremities with padding between legs (if tactically feasible) and secure the patient's feet (using a figure 8 knot) if not done already.
8. Record the date and time of application.

Improvised Pelvic Stabilization Devices

- Patient's belt, Sam Pelvic Sling, K.E.D. installed upside down, Blanket, 2 x Triangular Bandages, Elastic Straps from SAGER, etc.
- Same as above, the center of the device chosen as to be aligned with the greater trochanter.

8.7 Rapid Rhino Nasal Tampon

Indications:

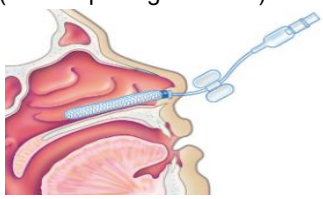
- Protocol 3.6 Other External Hemorrhages Anterior nasal bleeding from a site that is not clearly visible. Failure of nasal compression.

Contraindications:

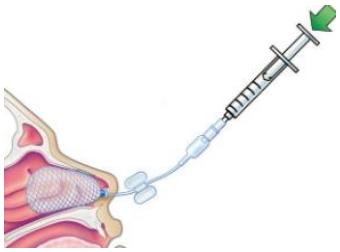
- Possible or identified skull base fracture
- Significant maxillofacial or nasal bone trauma
- Uncontrolled airway or hemodynamic instability

Procedure

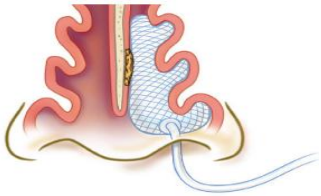
1. Remove device from packaging. Soak in sterile water for at least a FULL 30 seconds.
2. Insert tampon into nostril parallel to the septal floor or following along superior aspect of the hard palate until blue indicator is just past nares, (inside opening of nostril).



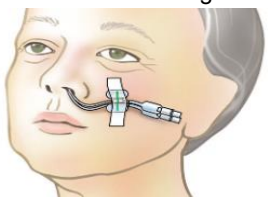
3. Use 20mL syringe slowly inflate Rapid Rhino device with AIR only. Monitor the pilot cuff with direct tactile feedback when the pilot cuff becomes round and feels firm when squeezed.



4. Inflate the cuff to provide a gentle, low-pressure tamponade, delivering the CMC fabric directly to the bleed site.



5. When there is sufficient pressure in balloon, allow the patient to sit for 15-20 minutes prior to discharge. Swelling in the balloon may need to be inflated more to avoid movement. After assessment of the pilot cuff, tape inflation catheter to the patient's cheek for discharge.



6. The patient should keep the device in for 24-72hrs. before removing and being reassessed. Before removing the tampon, remove the air from the bulb with a syringe

8.8 Nasal Tampon Procedure

Indications:

- Protocol 3.6 Other External Hemorrhages Anterior nasal bleeding from a site that is not clearly visible. Failure of nasal compression.

Contraindications:

- Possible or identified skull base fracture
- Significant maxillofacial or nasal bone trauma
- Uncontrolled airway

Procedure:

1. Apply 20mins of direct pressure over the anterior nasal pressure to the cartilaginous part of the nose.
2. If the maneuver does not control the bleeding a more invasive approach is required. If there is a clot blocking the view of where the bleeding is coming from ask the patient to blow their nose
3. Ensure the patient is sitting upright with their head slightly tilted forward to prevent blood from flowing into the back of the throat.
4. Instruct the patient to breathe through their mouth during the procedure.
5. With one hand, hold the patient's nose open by pinching the nostrils slightly.
6. Use your other hand to insert the tampon into the bleeding nostril. Gently insert it along the floor of the nasal cavity, advancing it as far as it will comfortably go without causing excessive pain or pressure.
7. Ensure the tampon is placed firmly against the bleeding site (usually the anterior part of the nasal septum). **Do not force** the tampon into place.
8. If there is resistance or the patient experiences significant discomfort, stop inserting and recheck the tampon’s size or adjust for a more comfortable position.
9. Secure string to side of patient’s cheek. The patient should keep the tampon in for 24-72hrs. before removing and being reassessed.
10. Observe the patient closely for any signs of discomfort, difficulty breathing, or significant bleeding. If the bleeding doesn't stop or worsens, additional measures or interventions may contact SMA.

8.9 Neck Wound Packing

Description:

- Pulsatile bleeding from the neck most likely represents injury to the carotid artery. Two major consequences of this injury in the field are exsanguination and loss of airway from compression by the expanding hematoma. Therefore, control of hemorrhage and establishment of a definitive airway must occur almost simultaneously.

Procedure (Packing):

1. On initial presentation, apply pressure with digits (if possible) directly on the damaged vessel, or direct pressure directly over the wound. Always look for an exit wound.
2. Slowly remove the pressure to locate the source of bleeding through digital exploration of the wound ("Feel the Bleed")
3. Expose and assess the wound (swipe the wound to remove any debris or blood clots). When assessing the wound ensure that there has been no involvement of the airway.
4. If there is airway involvement, secure the airway in accordance with the airway protocol.
5. If the wound is large enough to pack, pack with an approved hemostatic gauze by:
6. Making a small ball at the end of the gauze.
7. Insert this small gauze ball into the opening of the wound track.
8. While maintaining continuous finger pressure, continue to feed gauze into the wound track.
9. Pack the wound toward the source of the bleeding and following the wound track.
10. Pack the entire wound cavity and fill it tightly with hemostatic gauze. Make sure that no air pockets are created as you pack.
11. Overfill the cavity (this helps to transmit surface pressure to the source of the bleeding within the wound)

    NOTE: If hemostatic packing is not available, the use of plain gauze is acceptable

12. Once the wound track is completely packed, maintain direct pressure for 5 minutes. Disregard Combat Gauze manufacturer's instructions (3 minutes)
13. If plain gauze is used, maintain pressure for 10min.
14. If the packing is successful, apply an approved pressure dressing directly over the wound, securing it on the contralateral side in the axilla, to continue maintaining pressure.
15. If hemostatic packing fails to control bleeding after adequate pressure, remove the packing material and attempt a second application with new hemostatic packing.
16. If after 2*nd* attempt of packing and still having trouble managing the hemorrhage, contact SMA for guidance.
17. If wound is too small / unable to pack / digitally access the source of the bleed, apply a pressure dressing.
18. If a Foley catheter is inserted, ensure that the distal / running end of the Foley is clamped or knotted to prevent bleeding through the catheter.
19. On reassessment, if there are any signs of impending airway obstruction, or an expanding hematoma, secure the airway in accordance with airway protocol.

****Significant Considerations:**

- Control of a significant hemorrhage and establishment of a definitive airway often occur almost simultaneously.
- Pulsatile bleeding from the neck most likely represents injury to the carotid artery. This may be a very difficult wound to pack and get effective bleeding control
- The three major consequences of this injury in the field are:
    1. Exsanguination
    2. Loss of airway due to compression by the expanding hematoma, and
    3. Hematoma infiltration into the airway.

8.10 Hemorrhage from Abdominal Eviscerated Organs

Description

- For management of significant hemorrhage originating from eviscerated abdominal organs.

Procedure:

1. Rinse with clean fluid to reduce gross contamination.
2. If the source of the bleed can be visualized, use gauze-type hemostatic dressing with 5 minutes of finger clamping.
3. If the source of bleed cannot be visualized, cover the area with gauze-type hemostatic dressing without pressure.
4. Gently cover exposed bowel with a moist, sterile dressing or sterile water-impermeable covering (e.g., Saran Wrap).
5. Prevent evaporative cooling as exposed abdominal contents will result in more rapid heat loss.
6. Do Not reduce bleeding evisceration; close the skin by any means; or pack the abdominal cavity.

8.11 CT-6 Application

Indications

- Midshaft femoral fractures.
- CT-6 may be used as a rigid splint without traction (e.g. Tib/Fib fracture; Fractures adjacent to the knee).

Contraindications

- Patient with additional life-threatening injuries; time should not be taken to apply a traction splint.
- Pelvic fracture.
- Suspected femoral neck (hip) fracture.
- Supracondylar fracture of the distal head of the femur.
- Suspected fractures adjacent to the knee (a traction splint may be used as a rigid splint in this situation, but traction should not be applied).
- Fracture/Amputation of the ankle and foot.

Procedure:

1. Hold leg at the ankle and foot; Apply gentle traction to straighten out the fracture.
2. Measure on the uninjured leg, **leaving 6" below heel**.
3. Set the CT-6 to the right length and secure the top strap around patient hip.
4. Remove patient boot and check distal pulse.
5. Install the traction strap securely and tightly around patient ankle above malleolus.
6. Apply moderate traction using pulley, just to stabilize the splint.
7. Attach the straps to patient leg.
8. Start applying traction until pain is relieved, the distal pulse is returned and/or patient legs are equal length.
9. Secure traction device with a knot and secure the extra rope in the bottom strap.
10. Check distal pulse.
11. Place a blanket between patient legs and secure both legs together.
12. If the bone ends of an open fracture retract into the wounds during splinting, this information must be documented.

External hemorrhage from an open fracture

- Check distal pulse.
- Support leg.
- Cover the wound with a sterile dressing.
- Put bulky padding lengthwise on both sides of the fracture, over the dressing to protect the bone ends and tape the padding in place.
- Apply pressure dressing tightly enough to put pressure on the padding (so not on the fractured bone).
- Check distal pulse.
- Immobilize the leg

Femur fracture

- Description
  - Internal hemorrhage is also common with musculoskeletal trauma. It may result from damage to major blood vessels (many of which are located in close proximity to the long bones of the body), from disrupted muscle, and from the marrow of fractured bones. Significant blood loss can be associated with fractures. The internal blood loss from a femur fracture is approximately 1000mL to 2000mL (PHTLS). A bleeding fractured femur combined with other sources of hemorrhage, can quickly compromise the hemodynamic status of the patient. Accordingly, proper splinting of a suspected femur fracture is important.

8.12 Airway Management Techniques

Airway intervention required if:

Airway needs protection:

- Definition:
  - Diminished level of consciousness.
- Treatment:
  - Consider basic airway management principles including open the airway using basic airway maneuvers (Head-tilt-chin-lift; Jaw thrust; Chin lift; Recovery position if no spinal injuries); Suction; NPA; OPA; and use of Bag-Valve-Mask device prior to advanced management.
  - Consider Supraglottic airway device for long transport.
  - To be done during Tactical Field Care if tactically feasible.

Impending airway obstruction:

Definition:

- Expanding hematoma/mass causing airway distortion.
- Difficulty clearing secretions/blood/mucus from airway after injury.
- Anaphylaxis.
- Burned airway.
- Ventilation/oxygenation are preserved.

Special Consideration:

- Supraglottic airway does not protect the airway against aspiration.
- Treatment:
  - Consider basic airway management principles including open the airway using basic airway maneuvers (Head tilt-chin-lift; Jaw thrust; Chin lift; Recovery position if no spinal injuries); Suction; NPA; OPA; Supraglottic airway device; and use of Bag-Valve-Mask device prior to advanced management.
  - Supraglottic airway; allow one attempt orotracheally then move to surgical airway.

Mechanical obstruction/direct injury:

- Definition:
  - Blunt or penetrating direct tracheal injury and mechanical blockages such as food bolus, foreign object or depressed tongue; causing impaired ventilation/ oxygenation.
- Treatment:
  - Consider basic airway management principles including open the airway using basic airway maneuvers (Head tilt-chin-lift; Jaw thrust; Chin lift; Recovery position if no spinal injuries); Suction.
  - Finger sweep to remove foreign objects.
  - Chest compressions or Heimlich maneuver in case of choking.
  - Consider accessing airway through direct tracheal injury (opening) if possible.
  - Consider emergency surgical airway as a last resort.

Inability to oxygenate:

- Definition:
  - SpO_2 <92% on room air.
- Treatment:
  - Search for respiratory causes such as tension pneumothorax, flail chest, circumferential burn to chest, etc.
  - Allow a conscious casualty to assume any position that best protects the airway, to include sitting up/or leaning forward if no spinal injury.
  - Consider basic airway management principles: open the airway using basic airway maneuvers (Head-tilt-chin lift; Jaw thrust; Chin lift; Recovery position if no spinal injuries); NPA; OPA; Supraglottic airway device and use of Bag-Valve-Mask (BVM) device to assist breathing (if required).
    a. Provide supplemental oxygen, if available, to maintain saturation > 92%

8.13 NPA/OPA Principles

NPA Indications:

- Patient with a decreased LOC.
- Patient unable to maintain a patent airway.
- NPA can be used prophylactically, if tolerated, in the conscious patient with a patent airway if the provider suspects that the patient's GCS may rapidly deteriorate and/or regular monitoring of the patient/airway may not be possible.

Contraindications:

- Evidence has NOT supported the claim that facial/basilar skull fractures are a contraindication to the placement of an NPA. Correct insertion technique should minimize the risk.
- Patient has no need for an airway adjunct.

Complications:

- Bleeding caused by the insertion may be a complication.
- Mild hemorrhage from the nose after insertion is not an indication to remove it.

NPA Insertion Principles Measurement:

- The length of the NPA is important. It needs to be long enough to supply an air passage between the patient's tongue and posterior pharynx.
- The distance from the patient's nose (Tip) to the earlobe is a good estimate for the proper size.
- For an adjustable NPA, move the flange to the position that corresponds with the tip of the nose during sizing.

Insertion:

1. Bring the patient's head and neck into a neutral in-line position.
2. Select the nostril that is the largest and least deviated or obstructed.
3. Measure the NPA.
4. Lubricate the distal tip of the NPA with a water-based lubricant, ensuring not to occlude the lumen of the device.
5. Gently pull backward the tip of the nose ("Piggy" nose).
6. Insertion should follow an anterior-to-posterior plane, along the floor of the nasal cavity.
7. The bevel should be facing the septum:
    a. For Right nostril: Insert the NPA straight back through the nostril following the natural curvature of the airway.
    b. For Left nostril: Turn the NPA upside down (so that the bevel is toward the septum) and insert straight back through the nostril until you reach the posterior pharynx. Rotate the NPA 180 degrees an advance it down the pharynx.
8. If resistance is met at the posterior end of the nostril, a gentle back-and-forth rotation of the NPA between the fingers will usually aid in passing it beyond the turbinate bones of the nostril.
9. Should the NPA continue to meet with resistance, the NPA should not be forced past the obstruction but rather withdrawn, and the distal tip should be relubricated and inserted into the other nostril.
10. Continue insertion until the flange end of the NPA is next to the anterior nares or until the patient gags.
11. If patient gags or coughs, it can be a sign that the end of the NPA tube is in contact with the upper part of the larynx and has to be withdrawn slightly.
12. Verify appropriate sizing/placement of the NPA by visually confirming it has reached the pharynx. If sized and inserted correctly, you should not see the distal tip of the NPA as it sits posterior to the base of the tongue.

OPA Indications:

- Patient who is unable to maintain a patent airway.
- Patients who are easily able to tolerate an OPA should be considered candidates for SGA intubation.

Contraindications:

- Patient who is conscious or semiconscious.
- Patient with an intact gag reflex.

Complications:

- Because it stimulates the gag reflex, use of the OPA may lead to gagging, vomiting, and laryngospasm in patients who are conscious or have an intact gag reflex.
- If the device is too long, it can push the epiglottis over the opening of the larynx obstructing airflow to the trachea and causing a complete obstruction of the airway.
- If not inserted properly, it may push the tongue back into the airway, causing complete or partial obstruction.

OPA Insertion Principles Measurement:

- The distance from the corner of the. mouth to the earlobe (or to the angle of the jaw) is a good estimate for the correct size OPA.

Insertion:

1. Insert the OPA upside down or sideways and rotate into place after tip of OPA passes the tongue. This method should not be used for children.
2. The flanges of the OPA should be resting against the outside surface of the patient's teeth
3. If OPA causes gagging, remove it and replace it with NPA.
4. If OPA is displaced, remove it and redo the insertion procedure. Do not push it back into place. It might push the tongue back, obstructing the airway.

8.14 i-gel® (Supraglottic Airway Device) Insertion Principles

NOTE: A SUPRAGLOTTIC AIRWAY DEVICE DOES NOT PROTECT AIRWAYS FROM ASPIRATION

Indications:

- Patient that is unable to maintain a patent airway (GCS ≤ 8 or absence of gag reflex).
- Cardio-respiratory arrest.

Contraindications:

- Gag reflex present.
- Trismus; Limited mouth opening; Pharyngo-peri laryngeal abscess; Trauma or mass.
- Patient with any condition which may increase the risk of a full stomach (e.g.: Hiatus hernia; Sepsis; Morbid obesity; Pregnancy; History of upper gastro-intestinal surgery; etc.).

Cautions:

- Do not allow peak airway pressure of ventilation to exceed 40 cm H2O.
- Do not use excessive force to insert the device.
- Do not leave the device in place for more than four hours.
- Do not reuse or attempt to reprocess the i-gel®.

Key components and their function (i-gel® and Resus Pack)

- Description:
- The i-gel® is made from a medical grade thermoplastic elastomer. i-gel® has been designed to create a noninflatable, anatomical seal of the pharyngeal, laryngeal and perilaryngeal structures whilst avoiding compression trauma.

Types of Presentation:

- i-gel
- Cradle
- i-gel® Resus Pack
- i-gel®
- Cradle
- Airway Support Strap
- 12FR Suction Tube
- Water base Lubricant

Assemble the necessary equipment:

- Select appropriate size airway.
  Color coded full range size:
  Size 1:Neonate 2-5kg (4-11 Pounds).
  Size 1.5: Infant 5-12kg (11-26 Pounds).
  Size 2:Small Pediatric 10-25kg (22-55 Pounds).
  Size 2.5: Large Pediatric 25-35kg (55-77 Pounds).
  Size 3:Small Adult 30-60kg (66-132 Pounds) Resus Pack Yellow.
  Size 4:Medium Adult 50-90kg (110-198 Pounds) Resus Pack Green.
  Size 5:Large Adult 90 + kg (Over 198 Pounds) Resus Pack Orange.
- Water based lubricant (Provided with Resus Pack).
- Bag Valve Mask (BVM).
- C-collar (To help stabilizing the i-gel®).
- Tape or the Airway Support Strap.
- CO_2 Colorimetric Detector

Pre-use checks:

- Inspect the packaging and ensure it is not damaged prior to opening.
- Inspect the device carefully and confirm there are no foreign bodies or a bolus of lubricant obstructing the distal opening of the airway or gastric channel.
- Carefully inspect inside the bowl of the device, ensuring surfaces are smooth and intact and also that the gastric channel is patent.
- Discard the device if the airway tubes or the body of the device looks abnormal or deformed.

Pre-insertion preparation:

1. Always wear gloves.
2. Open the i-gel® package and on a flat surface take out the protective cradle containing the device.
3. Place a small bolus of the water-based lubricant (Provided with resus pack) onto the middle of the smooth surface of the cradle in preparation for lubrication. Do not use silicone-based lubricant.
4. Grasp the i-gel® along the integral bite block and lubricate the back, sides and front of the cuff with a thin layer of lubricant. This process may be repeated if lubrication is not adequate, but after lubrication has been completed, that no bolus of lubricant remains in the bowl of the cuff or elsewhere on the device. Avoid touching the cuff of the device with your hands.
5. Place the i-gel® back into the cradle in preparation for insertion.

N.B.: The i-gel® must always be separated from the cradle prior to insertion. The cradle is not an introducer and must never be inserted into the patient's mouth.

Warnings:

Do not place the device onto a pillow or the patient's chest and always use the protective cradle/cage pack provider.
Do not use unsterile gauze to help in lubricating the device.
Do not apply lubricant too long before insertion.

Insertion technique:

1. Grasp the lubricated i-gel® firmly along the integral bite block. Position the device so that the i-gel® cuff outlet is facing towards the chin of the patient.
2. The patient should be in "Sniffing" position with the head extended and neck flexed (If no spine injury).
3. Introduce the leafing soft tip into the mouth of the patient and direct towards the hard palate.
4. Glide the device downwards and backwards along the hard palate with a continuous but gentle push until a definitive resistance is felt.

NB: If there is resistance during insertion a "jaw thrust" is recommended.

5. At this point, the tip of the airway should be located into the upper esophageal opening and the cuff should be located against the laryngeal framework. Once resistance is met and the teeth are located on the bite block, do not repeatedly push i-gel® down or apply excessive force during insertion.
6. i-gel® should be secure with the Airway Support Strap or taped down from "maxilla to maxilla'.

7. Attach BVM.
8. Confirm placement:
9. Auscultate the epigastric region to r/o gastric inflation;
10. Auscultate breaths sounds bilaterally;
11. Confirm that the thorax rises evenly;
12. Attach a CO_2 Colorimetric Detector.
13. Apply C-collar if MOI requires it.

Important notes:

- Sometimes a feel of “giving-way” is felt before the end point resistance is met. This is due to the passage of the bowl of the i-gel® through the faucial pillars (Pharyngo-epiglottic folds).

Incorrect position:

- A horizontal line (Adult sizes 3, 4, 5 only) at the middle of the integral bite-block represents the correct position of the teeth. If the teeth are located lower than the distal tip of the bite block, then it is likely the device has been incompletely inserted. In this instance, remove the i-gel® and reinsert with a gentle jaw thrust applied by an assistant. If that does not resolve the problem, use one size smaller i-gel®.
- The pediatric sizes of i-gel® (Sizes 1 to 2.5) do not have a horizontal line on the integral bite block. This is due to the greater variability in the length of the oro-pharyngeal-laryngeal arch in children. As a result, insertion should continue, as with the adult sizes, until definitive resistance is felt. Air leakage through the gastric channel:
- A small air leak, or air venting through the gastric channel may be a useful mechanism to protect against gastric insufflation, but an excessive leak means the device is incompletely inserted. In such instances, remove the device and reinsert with a gentle jaw thrust applied by an assistant.

Withdrawal Procedure:

1. Place patient in recovery position and have suction ready.
2. Unsecure the tube.
3. Remove the tube.
4. Monitor patient, record, and document procedure.

8.15 Cricothyroidotomy Procedure

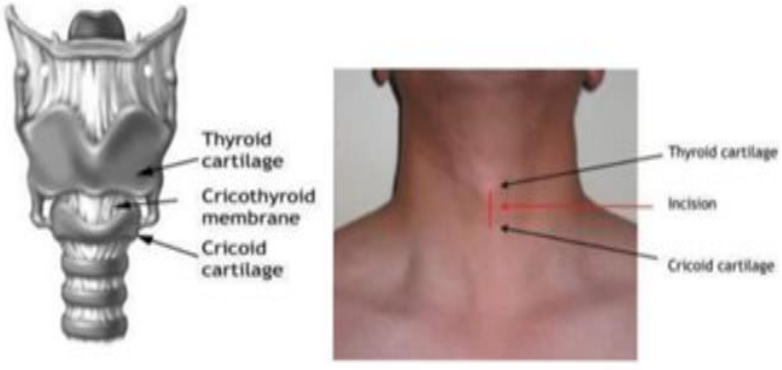
Indications:

- Airway obstruction due to injuries to the face or neck in which blood or disrupted anatomy precludes the ability to secure an airway by any other means.
- Inhalation burns that compromise the airway.
- Chemical inhalation injury that compromises the airway.
- Anaphylaxis that compromises the airway.

Procedure:

1. Assemble equipment:
   a. Cricothyroidotomy kit.
   b. Colorimetric Device.
   c. Bag-Valve-Mask device.
2. Place patient in supine position.
3. Hyperextend the patient's neck unless you suspect a Cervical Spine Injury (CSI). Even in a patient with a suspected CSI, an emergency surgical airway takes precedence. Every effort should be made to avoid movement of a potentially unstable CSI, but hyperextension is appropriate if a cricothyroidotomy cannot be performed effectively and without delay, in a neutral position.
4. Clean the area with iodine and/or alcohol swabs using aseptic technique.
5. Stabilize the larynx between your thumb and middle finger, ensuring not to pull the skin over the larynx to the left or right. Make a vertical incision 2-3 cm (3/4 – 1 inch) long midline over the cricothyroid membrane.
6. Retract the skin around the incision by applying slight downward pressure. Palpate the cricothyroid membrane with your index finger.
7. Lift your index finger and while still maintaining stabilization with your thumb and middle finger, puncture the membrane with the scalpel at 90 degrees to the patient. Extend the incision one scalpel blade width in both directions, to the patient's left and right. The scalpel blade should not be removed from the trachea (Until the tracheal hook is inserted, it is essential to maintain your landmark).
8. Using your non-dominant hand, slide the tracheal hook along the scalpel on the inferior side of the blade until you feel the posterior wall of the trachea and lift upward hooking the trachea.
9. Once trachea is hooked, remove the scalpel.
10. While maintaining tracheal traction, insert tube approximately 7.5 cm (3 inches) into trachea.
11. Inflate balloon.
12. Maintaining position of the tube, attach the BVM. Auscultate the epigastrium to rule out gastric insufflation. Ensure symmetrical chest rise and good breath sounds bilaterally. Confirm effective ventilation with a colorimetric end-tidal CO_2 monitor.
13. Secure tube in place with supplied device.

Monitor and continue reassessing casualty's respirations on a regular basis.



8.16 Chest Trauma Management Procedure

Indications:

- Known or suspected injury to the chest or underlying structures resulting from penetrating, blunt or blast trauma.
- Protocol 1.5 Vital Signs Absent.

Blunt Force Injury

- Blunt force applied to the chest wall is transmitted through the chest wall to the thoracic organs, especially the lungs.
- This wave of energy can tear lung tissue, which may result in bleeding into the alveoli. In this setting, the injury is called a pulmonary contusion (essentially a bruise of the lung).
- It can be made worse with fluid resuscitation.
- The impact on oxygenation and ventilation is the same as with penetrating injury.
- If the force applied to the lung tissue also tears the visceral pleura, air may escape from the lung into the pleural space, creating a pneumothorax and the potential for a tension pneumothorax.
- Blunt force trauma to the chest can also break ribs, which can then lacerate the lung, resulting in pneumothorax as well as hemothorax (Both caused by bleeding from the broken ribs, torn lung and intercostal muscles).
- Blunt force injury typically associated with sudden deceleration incidents may cause shearing or rupture of the major blood vessels in the chest, particularly the aorta, leading to catastrophic hemorrhage.
- Finally, in some cases, blunt force can disrupt the chest wall, leading to instability of the chest wall and compromise of the changes in intrathoracic pressure, leading to impaired ventilation.

Rib Fractures

- Several factors have been shown to contribute to the morbidity and mortality of patients with multiple rib fractures, including total number of ribs fractured, the presence of bilateral fractures, and increased age (65yrs and older). The elderly are especially susceptible to rib fractures, likely due to loss of cortical bone mass (osteoporosis), which allows the ribs to fracture after sustaining less kinetic force. Regardless of age, mortality increases as more ribs are fractured.
- Despite the ribs being fairly well protected by overlying musculature, rib fractures are a common occurrence in thoracic trauma. The upper ribs are broad, thick, and particularly well protected by the shoulder girdle and muscles
- Because it requires great energy to fracture the upper ribs, patients with upper rib fractures are at risk for harboring other significant injuries, such as traumatic disruption of the aorta.
- Rib fractures occur most often in ribs 4 to 8 laterally, where they are thin and have less overlying musculature.
- The broken ends of the ribs may tear muscle, lung, and blood vessels, with the possibility of an associated pulmonary contusion, pneumothorax, or hemothorax. Underlying pulmonary contusion is the most commonly associated injury seen with multiple rib fractures. Compression of the lung may rupture the alveoli and lead to pneumothorax.
- Fracture of the lower ribs may be associated with injuries of the spleen and liver and may indicate the potential for other intra-abdominal injuries. These injuries may present with signs of blood loss or shock.

Assessment of Rib Fractures:

- Patient with simple rib fractures will most often complain of chest pain with breathing or movement and difficulty breathing.
- They may have labored respirations.
- Careful palpation of the chest wall will usually reveal point tenderness directly over the site of the rib fracture, and crepitus may be felt as the broken ends of the rib grind against each other.
- The Combat Medic must assess vital signs, paying particular attention to the ventilatory rate and depth of breathing.
- Pulse oximetry also should be performed.

Management of Rib Fractures:

- Pain relief is a primary goal in the initial management of patients with rib fractures. This may involve reassurance and positioning of the patient's arms using a sling and swath.
- Keep in mind the potential for deterioration in ventilation and development of shock.
- Establishing IV access should be considered, depending on the patient's condition and anticipated transport time.
- The patient is encouraged to take deep breath and cough to prevent the collapse of the alveoli (atelectasis) and the potential for pneumonia and other complications.
- Rigid immobilization of the rib cage with tape or straps should be avoided because these interventions predispose to the development of atelectasis and pneumonia.
- Supplemental oxygen and assisting ventilations may be necessary to ensure adequate oxygenation.

Flail Chest

- Flail chest occurs when two or more adjacent ribs are fractured in more than one place along their length. The result is a segment of chest wall that is no longer in continuity with the remainder of the chest. When the respiratory muscles contract to raise the ribs up and out and lower the diaphragm, the flail segment paradoxically moves inward in response to the negative pressure being created within the thoracic cavity.
- This paradoxical motion of the flail segment makes ventilation less efficient. The degree of inefficiency is directly related to the size of the flail segment.
- The significant force necessary to produce such an injury is generally transmitted to the underlying lung, resulting in a pulmonary contusion. The patient thus may have two mechanisms compromising ventilation and gas exchange, the flail segment and the underlying pulmonary contusion, which is the bigger problem when it comes to compromising ventilation. The pulmonary contusion does not allow for gas exchange in the contused portion of the lung because of alveoli flooding with blood.

Assessment of Flail Chest:

- As with a simple rib fracture, assessment of flail chest will reveal a patient in pain. The pain is typically more severe, and the patient usually appears to be in distress.
- Respiratory rate is elevated, and the patient does not take deep breaths because of the pain.
- Hypoxia may be present, as demonstrated by pulse oximetry or cyanosis.
- Paradoxical motion may or may not be evident or easily recognized. Initially, the intercostal muscles will be in spasm and tend to stabilize the flail segment. As these muscles fatigue over time, the paradoxical motion becomes increasingly evident. The patient will have tenderness and potentially bony crepitus over the injured segment. The instability of the segment may also be appreciated on palpation.

Management of a Flail Chest

- Management of flail chest is directed toward pain relief, ventilatory support, and monitoring for deterioration.
- The ventilatory rate may be the most important parameter to follow and carefully measure.
- Patients who are developing underlying pulmonary contusion and respiratory compromise will demonstrate an increase in their ventilatory rate over time.
- Pulse oximetry, if available, is also useful to detect hypoxia.
- Oxygen should be administered to ensure an oxygen saturation of at least 92%.
- Obtain IV access.
- Analgesia should be considered (refer to Pediatric Pain Protocol 3.7 or Adult Pain Protocol 3.8).
- Support of ventilation with supraglottic airway and BVM may be necessary (particularly with prolonged transport times) for those patients who are having difficulty maintaining adequate oxygenation.

Pulmonary Contusion

- When lung tissue is lacerated or torn by blunt or penetrating mechanisms, bleeding into the alveolar air space can result in pulmonary contusion. As the alveoli fill with blood, gas exchange is impaired because air cannot enter these alveoli from the terminal airways.
- In addition, blood and edematous fluid in the tissue between the alveoli further impede gas exchange in the alveoli that are ventilated.
- Pulmonary contusion is almost always present in the patient with a flail segment and is a common and potentially lethal complication of thoracic injury.
- Deterioration to the point of respiratory failure may occur over the first 24hrs after injury.

Assessment of a Pulmonary Contusion:

- Assessment findings of the patient are variable depending on the severity of the contusion (% of involved lung).
- Early assessment typically reveals no respiratory compromise.
- As the contusion progresses, the ventilatory rate will increase and rales may be heard on auscultation.
- In fact, a rising ventilatory rate is often the earliest clue that a patient is deteriorating from pulmonary contusion.
- **A high index of suspicion is necessary, particularly in the presence of a flail segment.**

Management of a Pulmonary Contusion:

- Management is directed toward support of ventilation.
- Frequently reassess the ventilatory rate and any signs of respiratory distress.
- Continuous pulse oximetry and colorimetric, if available, should be utilized.
- Supplemental oxygen should be provided to all patients with suspected pulmonary contusion with a goal of maintaining oxygen saturation in the normal range (≥ 92%).
- Support of ventilation with supraglottic airway and BVM (if patient condition permits) may be necessary.
- In absence of hypotension (< 90 mmHg), aggressive IV/IO fluids should be administered judiciously as only as necessary to maintain blood pressure greater than 90 mmHg.

Tension Pneumothorax

- Tension pneumothorax is a life-threatening emergency.
- As air continues to enter the pleural space without any exit or release, intrathoracic pressure builds up.
- Intrathoracic pressure rises, ventilatory compromise increases and venous return to the heart decreases.
- The decreasing cardiac output coupled with worsening gas exchange results in profound shock.
- The increasing pressure on the injured side of the chest may eventually push the structures in the mediastinum toward the other side of the chest. This distortion of anatomy may further impede venous return to the heart through the kinking of the inferior vena cava as it passes through the diaphragm.
- Additionally, inflation of the lung on the uninjured side is increasingly restricted, and further respiratory compromise results.
- If not treated promptly, tension pneumothorax may progress from respiratory distress to shock and traumatic cardiac arrest. Respiratory distress may also result from other etiologies such as pulmonary contusion, hemothorax, inhalation injury, in addition to non-traumatic causes such as asthma.

8.17 Burping Procedure

1. Assess patient's torso (expose and rake above the level of the umbilicus, including armpits) and respiratory status. Consider sitting up casualties (without S/S of spinal injury) to perform a thorough inspection of trunk and to help relieve dyspnea.
2. Immediately cover the defect with gloved hand and apply an approved chest seal.
3. A vented chest seal should be used if available.
4. If indications of tension pneumothorax are present, peel back the chest seal, place gloved hands circumferentially around chest defect (align the tissues) and provide gentle downward pressure with the patient's expiration.
5. Replace chest seal immediately (before patient's inspiration).
6. If this procedure is ineffective (after 2 attempts) proceed with needle decompression (ND).
7. In case of a penetrating injury, place the patient in the supine position, recovery position or semi sitting position to help keep the airway clear/open (without S/S of spinal injury).

8.18 Procedure for Needle Decompression

Indications for Needle Decompression (Thoracostomy):

- Penetrating MOI: Unable to perform a burp or burp is ineffective.
- Blast/Blunt MOI: Patient still present S/S of tension pneumothorax.

Procedure for Needle Decompression (Thoracostomy):

1. Assess the patient's chest and respiratory status.
2. Landmarks are 4th/5th intercostal space anterior axillary line (AAL). **OR**
3. 2nd intercostal space in the mid-clavicular line (MCL) (always err on the approach of going too lateral rather than risk going too medial) or
4. Prepare site by wiping with an alcohol swab.
5. Insert a 14 gauge 3.25 inches cathelon/ angio catheter, perpendicular to the chest wall, along the superior border of the 3rd rib (mid-clavicular) or the 5th / 6th rib anterior axillary line, to avoid the neurovascular bundle.
6. Insert the needle/catheter unit all the way to the hub and hold it in place for 5-10 sec to allow decompression to occur.
7. After the ND has been performed, remove the needle and leave the catheter in place.
8. If the Combat Medic has a limited supply of needles/catheters units, they may be required to reuse them.
9. Reinsert the used needle in the protective cover to retain in the event of a future need.
10. Reassess the catheter often for effectiveness and consider the need to repeat the procedure.
    - If catheter becomes ineffective and you don't have another needle/catheter unit available:
        - Pull out the catheter from the chest.
        - Take your pre-used needle.
        - Gently push the needle through the catheter to remove any obstructions and to give the catheter its original shape.
        - Re-do the ND procedures with this needle (only on the same patient).
11. It is generally not advised to replace protective equipment over the thorax of an individual with a pneumothorax as it prohibits ready access for reassessment and repeat needle decompression. It can also interfere with normal chest wall movement and effective ventilation.
12. If a needle is removed from the thorax the site, NDC should be clearly marked with a circle with a cross through and the letters NDC, as well as be documented on a casualty card.

The ND should be considered successful if:

- Respiratory distress/tachypnea improves, Or
- There is an obvious hissing sound as air escapes from the chest when ND is performed (This may be difficult to appreciate in high-noise environments); Or
- O_2 Sat increases to 90% or greater (Note that this may take several minutes and may not happen at altitude); Or
- A patient with no vital signs has return of consciousness and/or return radial pulse.
- Return of a previously absent radial pulse or increase of SBP ≥ 90 mmHg.

If the initial ND fails to improve the patient's signs/symptoms from the suspected tension pneumothorax:

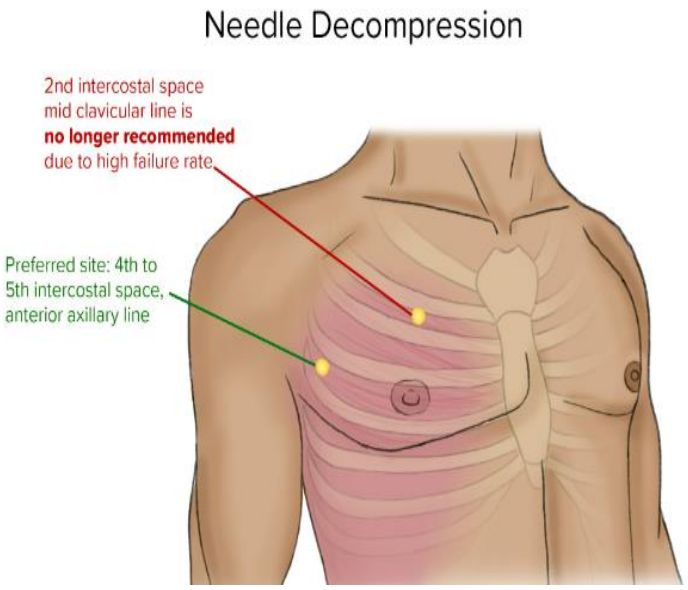
- Perform a second ND on the same side of the chest at whichever of the two recommended sites was not previously used. Use a new needle/catheter unit for the second attempt.

If the initial ND was successful, but symptoms later recur:

- Perform another ND at the same site that was used previously but laterally/posteriorly. Use a new needle/catheter unit for the repeat ND.
- Continue to reassess.

If the second ND is also not successful:

- If two consecutive needle decompressions have resulted in no clinical improvement, the patient's signs & symptoms may be caused by hemorrhagic shock or other conditions, and the provider should continue with assessment of circulation.
- Contact SMA.



8.19 Eye Trauma Principles and Management

Prevent an Eye Injury:

- Encourage all military personnel to wear only approved eye protection (Issued ballistic eyewear).
- Discourage contact lens use.

The eye is extremely intolerant to injury

- Eye trauma requires prompt evaluation and treatment by an eye surgeon.
- The foundation for successful treatment and preservation of vision is most often laid in the initial phases by forward medical providers at all echelons of care.

Maintain high index of suspicion based upon mechanism of injury:

- Blast injury.
- Direct facial and eye trauma.
- Cranial or brain injury.
- Metal on metal mechanism.
- Compressive blunt force trauma.
- Multisystem trauma (It is easy to overlook ocular trauma).
- Unconscious patient who cannot report vision change.
- Thermal burns.

Diagnostic Criteria for Ruptured Globe:

- Exam findings:
  - Collapsed or severely distorted eye.
  - Open wound, full-thickness corneal or scleral laceration.
  - Peaked or irregular pupil.
  - Prolapse of intraocular contents outside the eye. Dark tissue is iris or uveal tissue.

DO NO HARM (Do nots):

- Do not let a suspected eye injury leave your level of care without rigid eye protection.
- Do not patch (it puts pressure on the eye).
- Do not wrap (it puts pressure on the eye).
- Do not place anything under an eye shield, including gauze.
- Do not put pressure on an eye with suspected open globe injury; it may increase the risk of extrusion of the intraocular contents.
- Do not remove impaled or resistant foreign bodies.
- Do not attempt to repair eye

8.20 Pain Management

Context: The following reference should be used in conjunction with Protocol 3.8 Pediatric Pain, Protocol 3.9 Adult Pain and 3.10 Penthrox Pain and provides additional guidance/considerations for analgesia in the adult trauma patient with pain.

Analgesia General Considerations:

- Patients should be disarmed when given Penthrox, Oral transmucosal fentanyl citrate (OTFC) or Ketamine.
- For all patients given opioids or ketamine, closely monitor airway, breathing and circulation. Initiate close monitoring of vital signs, using an advanced electronic monitor (if available).
- Evaluate mental status and document findings prior to administering opioids or ketamine.
- Have Naloxone readily available when using opioid analgesics (e.g. Fentanyl) – Refer to Protocol 4.1 Narcotic Overdose.
- If respirations are noted to be reduced after using opioids or Ketamine, provide ventilatory support with a BVM.
- Prior to escalating any treatment for pain, consider other potential physiologic etiologies.
- Adequate early pain control has been shown to reduce incidence of post-traumatic stress disorder and development of chronic pain syndromes.

Mild to Moderate Pain

- Ibuprofen 800mg PO q8hrs PRN OR Meloxicam 15mg PO once; AND/OR Acetaminophen 1g PO
- q6hrs.
- Preferred where patients able to fight (e.g. isolated fracture, eye injury, minor burns) as alternative analgesia (opioid) would require disarming.
- Aspirin, Motrin, Toradol and other nonsteroidal anti-inflammatory drugs (NSAIDs) other than Meloxicam should be avoided in hemorrhage because they interfere with blood clotting. Meloxicam and Tylenol DO NOT interfere with platelet function.
- For management of pain of a non-traumatic etiology (medical) – consult relevant protocol (e.g. Protocol 1.1 Chest Pain) or consult SMA.

Moderate to Severe Pain

Penthrox (Methoxyflurane)
(NOT used in Respiratory Distress or Shock and NOT at significant risk of developing either condition)

- Ensure the Activated Carbon (AC) Chamber is inserted into the dilutor hole on top of the Penthrox inhaler.
- Remove the cap of the bottle by hand. Alternatively, use the base of the Penthrox inhaler to loosen the cap with a ½ turn. Then separate the inhaler from the bottle and remove the cap by hand.
- Tilter the Penthrox inhaler (green tube) to a 45^{o} angle and pour the total contents of ONE Penthrox
- bottle into the base of the inhaler, while rotating to ensure wick is adequately saturated. **Fruity Scent
- Place loop over patients' wrist

Oral transmucosal fentanyl citrate (OTFC) 800 µg transbuccal – CLASS B:
(NOT in Respiratory Distress or Shock and NOT at significant risk of developing either condition):
Tape lozenge on a stick to patient's thumb as an added safety measure.
Reassess in 15mins.
May repeat with a second lozenge as necessary to control severe pain.
Monitor for respiratory depression and decreasing level of consciousness.
For medication induced nausea and vomiting: Dimenhydrinate 50mg IM/PO q4hr PRN

Ketamine

- **Dose**: Ketamine 50mg IM or IN with atomizer q30min x 2 doses total. Ketamine IM/IN use 50mg/mL undiluted.
- **Ketamine is a" Dissociative" anesthetic that distorts perceptions of sight and sound and produces feelings of detachment or dissociations from the environment and self.**
- At lower doses, it provides potent analgesia and mild sedation.
- At higher doses, it provides dissociative anesthesia and moderate to deep sedation.
- It poses less risk of respiratory depression that fentanyl and has a very favorable safety profile.
- Ketamine may be a useful adjunct to reduce the amount of opioids required to provide effective pain relief and Ketamine can be added to patients who have received morphine or OTFC with incomplete pain control. However, patients must be closely monitored and have continuous pulse oximetry if both Ketamine and an opioid are administered concurrently as the risk of respiratory depression and/or loss of airway reflexes will be increased.
- End Points of Ketamine Administration:
    - Control of pain or any signs of sedation.
    - Signs of sedation include the development of a trance-like state (open eyes and unresponsive) or nystagmus (rhythmic back-and-forth movement of the eyes).
- Transient laryngospasm is a rare complication (0.3%) associated with administering Ketamine at sedative doses. The incidence at lower analgesic doses is unknown, but likely less. If it is suspected, the first step is to simply reposition the airway to rule out a mispositioned airway as the cause of respiratory distress. If this fails, bag-valve mask ventilation should be administered until the laryngospasm has resolved. If this does not result in adequate ventilation, refer to Protocol 2.1 Airway.
- Observe for increased secretions and be prepared to suction
- Naloxone does not reliably reverse the effects of Ketamine
- Eye injury is considered a relative contraindication to the use of Ketamine. However, the risk of additional damage to the eye from Ketamine is long and it **SHOULD BE USED** even if there is an eye injury, and the patient is in shock or respiratory distress or at significant risk for either.

Emergence / Recovery Reaction

If a patient is inadvertently sedated, there is a risk (up to 30%) of a "recovery reaction".

While usually mild, on the rare occasion, reactions can be pronounced and include hallucinations (pleasant and unpleasant) delirium, excitation and physical combativeness.

8.21 Saline Lock

Indications:

- Any time IV access is required but fluid volume replacement is not immediately indicated.[1]
- In a tactical environment (in TFC), and where a casualty is in shock or at risk of going into shock, start a saline lock with an 18G catheter.[2]

N.B:

- Where a patient is anticipated to require multiple IV medications or therapies, the Combat Medic may consider initiating bilateral saline locks (If time permits and does not delay appropriate care/evac of the patient).
- If IV access is not obtainable and fluid therapy is indicated, use the IO route with recommended IO device (Procedure 8.20 Intraosseous Access).

Preparation of a Saline Lock

- Fill a 3-5 mL syringe with NS.
- If the saline lock was not in its sealed package, clean interlink with alcohol swabs.
- Fill the saline lock with NS (no air bubbles).

Maintenance of Saline Lock

- Flush with 3-5 mL NS
- Must be done:
    - On all sizes and types of saline lock (Interlink® Injection site, SmartSite® Extension set and others).
    - At insertion.
    - After 6hrs. of inactivity.
    - Before and after medication administration.
    - When blood is present in the lock.

Procedure for clinical setting:

1. Gain IV access if not already achieved.
2. Attach saline lock to the IV catheter.
3. Secure IV catheter with small Tegaderm®.
4. Slowly flush catheter with 3-5 mL NS.

Procedure for field setting:

1. Gain IV access if not already achieved.
2. Attach saline lock to the IV catheter.
3. Slowly flush catheter with 3-5 mL NS.
4. Completely cover the saline lock and IV catheter with large Tegaderm®.
5. If the Saline Lock needs to be flushed again later, slowly flush catheter with 3-5mL NS using a syringe / needle unit. Pierce through the Tegaderm® after cleaning the area with an alcohol swab.
6. If the casualty subsequently requires fluid, attach the IV line to the BD Interlink® Lever Lock Cannula and pierce through the Tegaderm® after cleaning the area with an alcohol swab.

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1. The saline lock may facilitate the loading and transporting of a patient. If the patient's condition changes, it may require changing to an appropriate IV solution.
2. A saline lock is preferred in a dynamic environment where a conventional IV access line presents restrictions on mobility and risks being inadvertently dislodged.

8.22 Perform an Intraosseous (IO) Access

Indication:

- Requirement to give fluid and unable to obtain IV access.

Contraindications:

- Fracture of the bone selected for IO infusion (Select an alternate site).
- Infection at the site selected for insertion (Select an alternate site).
- Excessive tissue (Severe obesity and/or absence of adequate anatomical landmarks), consider alternate site.
- Osteoporosis (Not a contraindication with a drill).
- Previous, significant orthopedic procedure at the site, prosthetic limb or joint.
- IO access (or attempted) in targeted bone within past 48hrs.

Considerations:

- Ensure the administration of a rapid and vigorous 10mL flush with Normal Saline prior to infusion **"NO FLUSH = NO FLOW":**
- Repeat syringe bolus (flush) as needed.
- FAST 1^{TM} IO and T.A.L.O.N.TM IO can be left in place for up to 24hrs.
- IO through burns:
- An IO device can be inserted through burned skin as long as the underlying bone has not been compromised. It is important to be aware that swelling due to post-burn edema may be severe enough to affect the stability of the IO access site. **Important:** Reassess site frequently for signs of dislodgement.
- CPR and sternal IO:
- With the FAST 1^{TM} IO, CPR can be performed with IO in place and/or a C-collar installed.
- IO medication administration is the same as IV administration.
- Use in pediatrics:
- Pediatric patients use proximal tibial insertion site only.
- Compartment Syndrome is a serious complication that can result if a large infiltration and/or extravasation goes undetected.
- The IO insertion site should be monitored frequently for any signs of infiltration and/or extravasation.

Equipment:

Appropriate type of intraosseous needle set based on insertion location.
Alcohol swabs.
One (1)10mL syringe with Sterile Saline solution for flush.
One (1) infusion tube primed with fluid of choice.
IV line and IV bag primed and ready for use

T.A.L.O.N.^{TM}

Description:

- Manual Needle Set contain a stylet and a catheter. When the stylet is removed the catheter Luer Lock is exposed. The catheter is a 15G, 38.5mm, made of 304 stainless and provided sterile, non-pyrogenic in a sealed kit.

Sites of insertion:

- The T.A.L.O.N.^{TM} device provides intraosseous access in the sternum, proximal tibia, distal tibia, and proximal humerus head of adult and proximal tibia for pediatric patients, when intravenous access is difficult or impossible to obtain for up to 24hrs.

Sternal Site Identification

The sternal locator MUST be used when inserting the needle set into the sternum. The Sternal Locator is designed to provide easy identification of the insertion site, safe insertion depth (preventing over penetration) and secure the catheter in place decreasing the risk of dislodgement. Check skin adipose and muscle thickness before insertion. Special caution must be exercised with patients with BMI greater than 30.

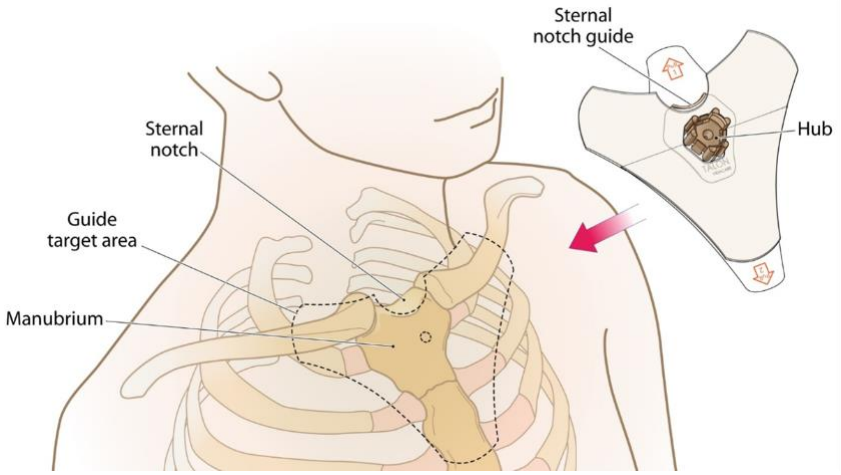
PROCEDURE

Utilize appropriate Body Substance Isolation Precautions, use a clean, “no touch” technique, maintaining asepsis.

Prepare infusion system/prime EZ-Connect® Extension Set.

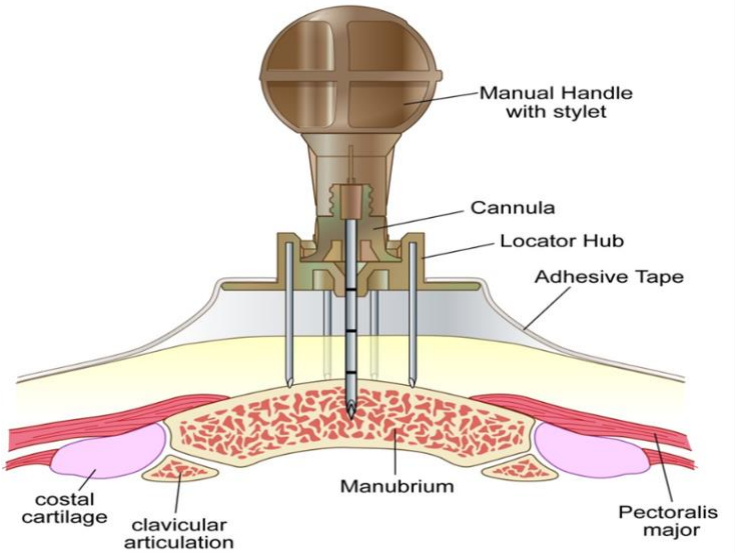
Prepare insertion site.

1. Locate the sternal notch by palpation. Note that the manubrium lies below the sternal notch. Remove sternal locator dressing cap and pull tab 1.
2. Align curve (sternal notch guide) on top of the Sternal Locator with the patient’s sternal notch.
3. Press the hub firmly and evenly downward into the patient. The six probe tips should penetrate the skin and rest firmly on the manubrial surface; probes should NOT penetrate the cortex of the bone.
4. Remove tab 2 and secure the adhesive to the skin.

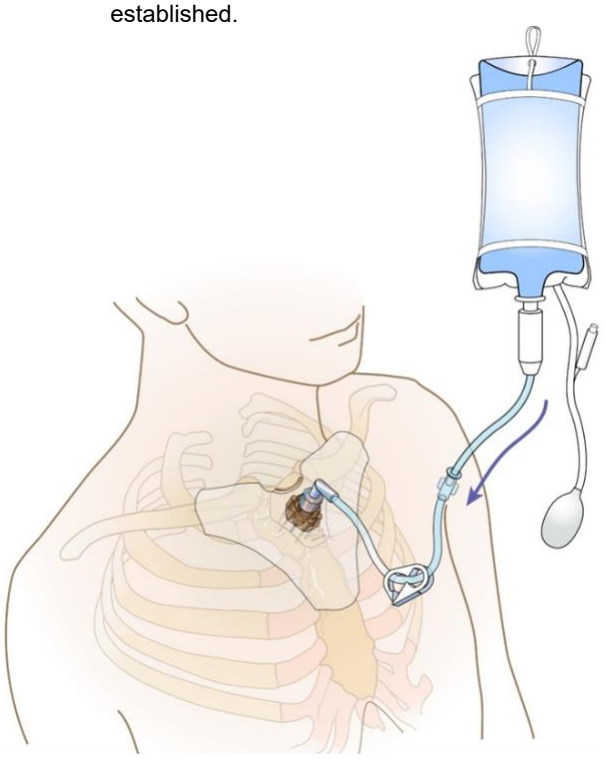


Procedure (cont.)

5. With the needle set tip at a 90-degree angle to the bone, place the tip into the hole in the center of the sternal locator dressing.
6. Gently insert until the tip of the needle set touches bone.
7. Penetrate the bone cortex by rotating clockwise while applying gentle, steady downward pressure (10-15 lbs / 5-7 kg). The handle on the stylet is designed to utilize the fingers for better tactile feedback and prevent excessive pressure. Do not rock or bend during insertion. Maintain a 90-degree angle to the bone.
8. Stop the insertion process upon entry into the medullary space and as indicated when a click is felt or heard as the needle set locks into the sternal locator dressing. The needle set MUST lock into the sternal locator dressing to prevent movement and reduce the risk of dislodgement.

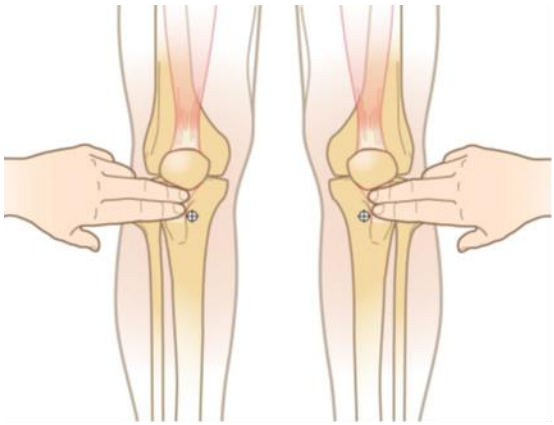


9. Hold the hub of the needle set and twist the handle counterclockwise to remove the stylet.
10. The needle should feel firmly seated in the bone (1st confirmation of placement).
11. Place stylet in a sharp's container.
12. Dispose of all sharps and biohazard materials using standard biohazard practices and disposal containers. If using the NeedleVISE® 1-Port Sharps block, place on stable surface and use a one-handed technique.
13. Attach the primed extension set to the catheter hub and twist clockwise to secure.
14. Aspirate for blood/bone marrow (2nd confirmation of placement) * Confirm placement by flushing 5-10mL normal saline (adult) and 2-3mL normal saline
15. Inability to withdraw blood from the catheter does not mean the insertion was unsuccessful. Consider attempting to aspirate after the flush. Site placement can also be confirmed by ability to administer pressurized fluids and noting the pharmacologic effects of medication administration after flow is established.



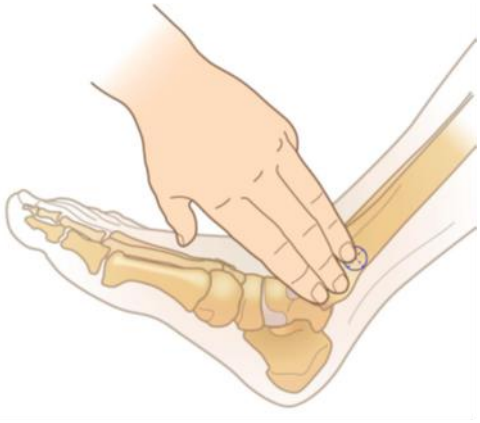
Adult proximal tibia site identification

Extend leg. Insertion site is approximately 3 cm (two finger widths) below the patella and approximately 2 cm medial, along the flat aspect of the tibia.



Adult distal tibia insertion site identification

Extend leg. located approximately 3 cm (2 finger widths) proximal to the most prominent aspect of the medial malleolus. Palpate the anterior and posterior borders of the tibia to assure that your insertion site is on the flat center aspect of the bone.

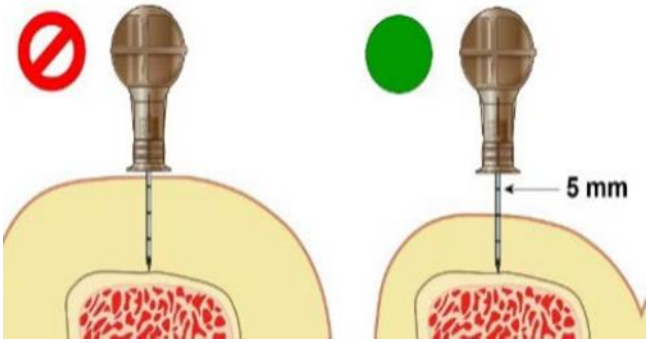


Tibial Insertion Angle

Insert needle set at a 90-degree angle to the bone for tibial insertions.

TIBIA INSERTION TECHNIQUE

1. Stabilize the extremity / Prepare and clean the skin
2. Push the EZ-IO® T.A.L.O.N.™ Needle Set tip through the skin until the tip rests against the bone.
   - The 5 mm mark must be visible above the skin for confirmation of adequate needle length.
3. Penetrate bone cortex with steady, firm pressure, maintaining the correct angle.



   - **Do NOT use excessive force. Do NOT rock or bend needle set during insertion**.
   - **Maintain 90-degree angle to the bone**.
   - **Catheter tip rotation (clockwise) provides penetrating action**.
4. Stop insertion process when desired depth is obtained or catheter hub is flush with the skin.
   - Insertion time varies as bone density varies from patient to patient.
5. Hold the needle set hub while twisting the stylet off the hub with counterclockwise rotations.
   - The needle should feel firmly seated in the bone (1st confirmation of placement).
   - Place the stylet in sharps container.
6. Always dispose of all sharps and biohazard materials from intraosseous lines using standard biohazard practices and disposal containers.
7. Place an EZ-Stabilizer® Dressing over the catheter hub.
8. Attach the primed extension set.
   - **Do Not attach a syringe directly to the T.A.L.O.N. TM catheter hub's Luer Lock.**
9. Remove EZ-Stabilizer Dressing tabs to expose adhesive and apply to skin.
10. Aspirate for blood/bone marrow (2nd confirmation of placement) *

*Absence of blood or inability to withdraw aspirate at the catheter hub does **not** mean the insertion was unsuccessful. Site placement can also be confirmed by ability to administer pressurized fluids, and noting the pharmacologic effects of medication administration after flow is established.

Confirming placement

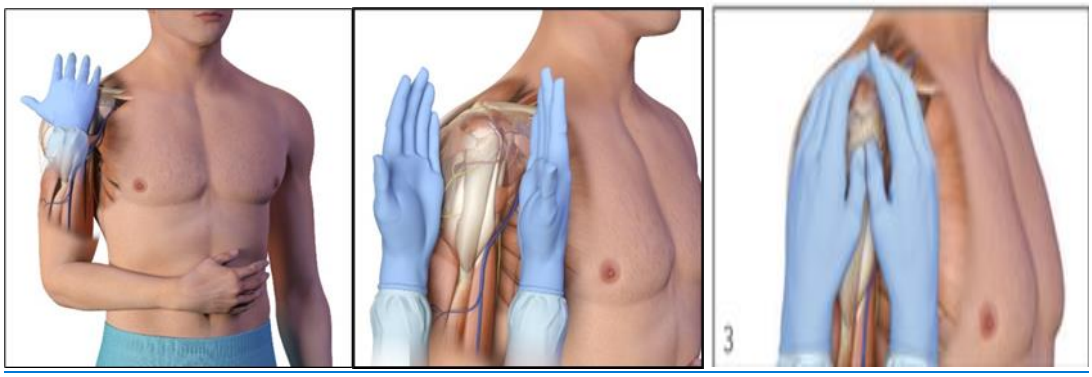
1. Confirm catheter stability. Catheter should be stabilized to prevent dislodgement.
2. Attach primed EZ-Connect® extension set to catheter Luer Lock hub.
3. Confirm placement by flushing 5-10mL normal saline (adult) and 2-3mL normal saline
4. (infants / child) into the intraosseous space and draw back into syringe to observe for flashback (blood or marrow). Then flush the contents of the syringe back.
5. Disconnect 10mL syringe from EZ-Connect® extension set.
6. Connect primed EZ-Connect® extension set to primed IV tubing.
7. Begin infusion, secure tubing and monitor extremity for complications.

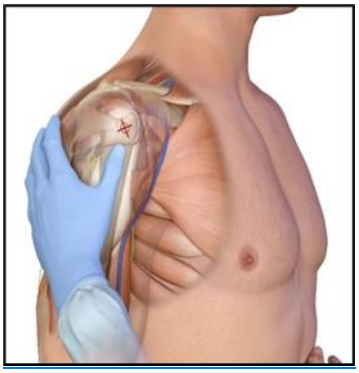
Note: Frequently monitor the insertion site for infiltration and /or extravasation. <u>Do Not</u> return used stylet to the EZ-IO kit.

Identify the proximal humerus:

1. Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated)
2. Place your palm on the patient's shoulder anteriorly. The area that feels like a "ball" under your palm is the general target area. You should be able to feel this ball, even on obese patients, by pushing deeply.
3. Place the ulnar aspect of one hand vertically over the axilla
4. Place the ulnar aspect of the opposite hand along the midline of the upper arm laterally
5. Place your thumbs together over the arm - this identifies the vertical line of insertion on the proximal humerus
6. Palpate deeply up the humerus to the surgical neck - it will feel like a golf ball on a tee – the spot where the "ball" meets the "tee" is the surgical neck

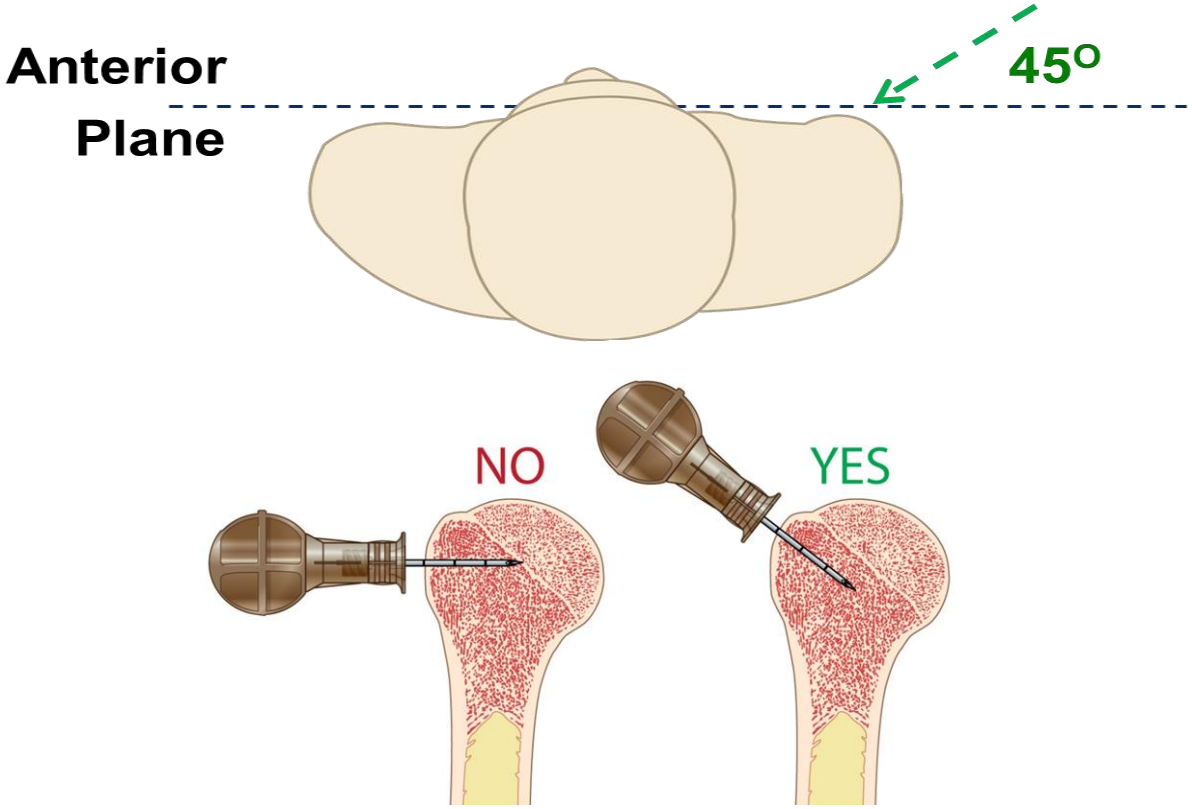
The insertion site is on the most prominent aspect of the greater tubercle, 1 to 2 cm above the surgical neck





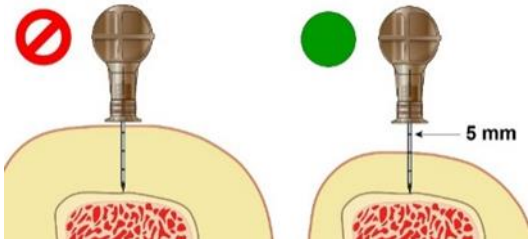
Proximal Humerus Insertion Angle

Insertion angle is important, to ensure placement that will provide optimal vascular access. For the proximal humerus insertion, aim the needle set tip at a 45-degree angle to the anterior plane and posteromedial.



Adult Proximal Humerus Insertion Technique

1. Stabilize the extremity.
2. Push the T.A.L.O.N.™ Needle Set tip through the skin until the tip rests against the bone.
    - The 5 mm mark must be visible above the skin for confirmation of adequate needle length.



3. Penetrate bone cortex with steady, firm pressure, maintaining correct angle.

- Do NOT use excessive force. Do NOT rock or bend needle set during insertion. Maintain 45-degree angle to the horizontal (anterior) plane.
- Catheter tip rotation (clockwise) provides penetrating action.

4. Stop insertion process when desired depth is obtained or catheter hub is flush with the skin.
   - Insertion time varies as bone density varies from patient to patient.
5. Hold the needle set hub while twisting the stylet off the hub with counter clockwise rotations.
   - The needle should feel firmly seated in the bone (1st confirmation of placement).
   - Place the stylet in a sharp container.
6. Always dispose of all sharps and biohazard materials from intraosseous lines using standard biohazard practices and disposal containers
7. Place an EZ-Stabilizer® Dressing over the catheter hub
8. Attach the primed extension set.
   - **Do Not attach a syringe directly to the T.A.L.O.N. TM catheter hub's Luer Lock.**
9. Remove EZ-Stabilizer Dressing tabs to expose adhesive and apply to skin.
10. Aspirate for blood/bone marrow (2nd confirmation of placement) *

*Absence of blood or inability to withdraw aspirate at the catheter hub does not mean the insertion was unsuccessful. Site placement can also be confirmed by ability to administer pressurized fluids, and noting the pharmacologic effects of medication administration after flow is established.

Confirming placement

1. Confirm catheter stability. Catheter should be stabilized to prevent dislodgement.
2. Attach primed EZ-Connect® extension set to catheter Luer Lock hub.
3. Confirm placement by flushing 5-10mL normal saline (adult) and 2-3mL normal saline
4. (infants / child) into the intraosseous space and draw back into syringe to observe for flashback (blood or marrow). Then flush the contents of the syringe back.
5. Disconnect 10mL syringe from EZ-Connect® extension set.
6. Connect primed EZ-Connect® extension set to primed IV tubing.
7. Begin infusion, secure tubing and monitor extremity for complications.

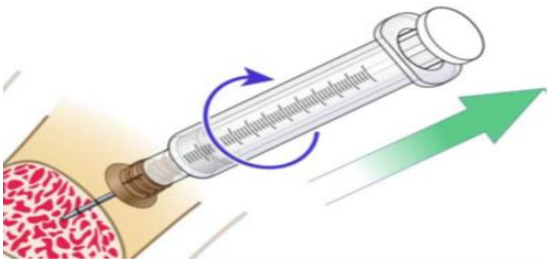
Note: Frequently monitor the insertion site for infiltration and /or extravasation. <u>Do Not</u> return used stylet to the EZ-IO kit.

Removal procedure:

HUMERUS or TIBIA Removal

1. Remove the extension set and dressing
2. Attach a luer lock syringe to the catheter hub
3. Stabilize the extremity
4. Using the syringe as a handle, <u>rotate syringe and catheter clockwise</u> while pulling straight out

Do not rock or bend during removal.



TELEFLEX FAST1™ IO

Description:

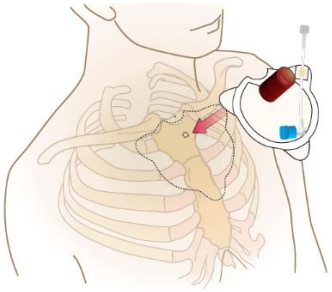
- Muscle-powered (not battery-dependent, spring loaded or pneumatic). Actual force will vary depending on patient anatomy.
- "All-in-one" IO engineered for automatic depth control (penetrates 6 mm into the manubrium).
- Can be use on adult patients only.

Site of insertion:

- **Only sternal.**

Procedure:

1. Expose the sternum and locate the sternal notch.
2. Clean infusion site with alcohol swabs.
3. Place Target patch. Align notch in patch with sternal notch
    - Ensure hole in patch is over casualties' midline. Adjust if error is greater than about 1 cm from midline.
4. Stand or kneel at patient head.
5. Twist to remove Sharps Protection Cap.
6. Place Stabilizer needles in target zone.
7. Hold FAST 1™ perpendicular to manubrium.
8. Press down smoothly with increasing force until you hear and feel the Infusion Tube separate from the FAST1™
9. Pause & Pull Back: Withdraw FAST 1™ straight back (on axis) while holding down the Target patch.
10. Immediately push Stabilizer needles into the bright red sharps foam plug.
11. Remove blue cap and connect infusion tube to friction fitting on tubing attached to Target patch.
12. Remove white cap from Luer fitting and connect IV tubing.
    - This device does not come with a saline lock and will need to be added separately
13. Ensure all IV tubing is primed up to the infusion tube
14. Confirm placement by flushing 2-3mL into the intraosseous space and draw back into syringe to observe for
15. Flashback (blood or marrow). Then flush the contents of the syringe back.
16. Remove the liner from the Protective Dome and apply the Dome over the Target foot infusion site.
17. Begin infusion, secure tubing and monitor insertion site for complications.



- Always dispose of all sharps and biohazard materials using standard biohazard practices and disposal containers.
- Apply pressure as needed. Dress site as appropriate.
- There are no activity restrictions after the catheter is removed.
- The patient should be directed to seek medical care if they experience signs and symptoms of infection, pain near the insertion site or any other unusual symptoms.

Removal procedure:

1. Remove protective dome from the target foot.
2. Turn off the source of fluid and disconnect.
3. Grasp infusion tube with fingers as close as possible to patient's skin.
4. Pull perpendicular to manubrium until entire infusion tube emerges from the patient's chest.
5. Inspection infusion tubing ensuring no parts remain in patient.

Note: Pull in one quick continuous motion until remove.

Note: Use the tube to pull, not the Luer Lock® connection. It is normal for the tubing to stretch.

8.23 IV Flow Rate Calculation

IV Flow Rates

$$\frac{\text{Vol to be infused in mL} \times \text{Drops of admin set in} \frac{\text{gtt}}{\text{min}}}{\text{Total time of infusion in min}}$$

Example:

- Volume to be infused is 5040mL in 8hrs

$$\frac{5040\text{mL} \times \frac{10\text{gtt}}{\text{min}}}{480\text{min}} = \frac{105\text{gtt}}{\text{min or at } 2\frac{\text{gtts}}{\text{sec}}}$$

Drug Administration

$$\frac{\text{Desired dose in mg}}{\text{Concentration on handin} \frac{\text{mg}}{\text{mL}}} = \text{Volume to be administered}$$

Example:

- Desired Dose is 20mg, Concentration on Hand is 10mg/mL

$$\frac{20\text{mg}}{10\text{mg/mL}} = 2\text{mL}$$

Child's Weight (1-6yrs)

$$(2 \times \text{age in yeas}) + 8 = \text{approx weight in kg}$$

Example:

$$(2 \times 2\text{years}) + 8 = \text{approx } 12\text{kg}$$

8.24 IV Drip Rate Charts

Micro Infusion Set – 60 gtt Per Milliliter (gtt/mL)

Solutions Per Hour	Drop Rate Interval (Seconds)
10mL	6
20mL	3
30mL	2
40mL	1.5
50mL	1.2
60mL	1.0

Macro Infusion Set – 10 gtt Per Milliliter (gtt/mL)

Solutions Per Hour	Drop Rate Interval (Seconds)
50mL	7.2
100mL	3.6
150mL	2.4
200mL	1.8
250mL	1.4
300mL	1.2
360mL	1.0

8.25 Medication Calculations, Reconstitutions & Dilutions

Calculations

Principle Calculations:

- Basics Conversions:

$$1\text{kg} = 2.2\text{lbs}$$

- Examples:

$$30\text{kg} \times \frac{2.2\text{lbs}}{\text{kg}} = 66\text{lbs}$$

$$30\text{lbs} \times \frac{1\text{kg}}{2.2\text{lbs}} = 13\text{kg}$$

Note: Always round down to the nearest kilogram or pound.

- 1kg = 1000 g
- 1g = 1000mg
- 1L = 1000mL

What amount do I have to draw from the ampoule/vial to get the correct dose?

$$\left(\text{Concentration of drug I have}\right) \times \left(\frac{\text{Dose of drug I need}}{x\ \text{mL}}\right) \rightarrow\ x = \begin{matrix}\text{mL to draw} \\ \text{from ampule}\end{matrix}$$

Reconstitution Procedure

1. Ensure you have proper size syringe; needle attachment; diluent appropriate for the medication used; 2 x alcohol swabs.
2. Determine what dose you need to treat the patient (e.g.: adult vs. child).
3. Read label on drug vial to ensure you are using the exact amount of diluent needed.
4. Determine what type of diluent you need.
5. Use withdrawal of diluents technique to get the determined amount of diluent.
6. Shake powder in drug vial.
7. At a 90-degree angle, inject the diluent into the drug vial and remove needle.
8. Manipulate vial gently to ensure all powder has dissolved with no precipitates visible.
9. The drug is now ready for use.
10. Use withdrawal of medications from a vial technique to prep the dose for the next step

8.26 Burn Assessment and Fluid Replacement Principles

Fluid Replacement Requirements for Burn Victims Basic Principles:

- If burns are greater than 20% of Total Body Surface Area (TBSA), fluid resuscitation should be initiated as soon as IV/IO access is established.
- Resuscitation should be initiated with Ringer's Lactate (RL) preferably. If not available give maximum of 2000mL Normal Saline and then switch to RL when available or contact SMA for future direction.
- If Hemorrhagic Shock is present/suspected, resuscitation for Hemorrhagic Shock takes precedence over resuscitation for burns. If in Hypovolemic Shock not associated with suspected Hemorrhage, give IV bolus of 500mL RL (or Normal Saline if RL unavailable) up to 4 times until BP ≥ 90 mmHg, then, start the burn fluid resuscitation as per Parkland Formula (Pediatric) or USAISR Rule of Ten (Adult).
- Both calculations (Parkland/USAISR) provide initial IV fluid rate of administration. Adjust fluid rate hourly based on urinary output in order to titrate IV administration (Refer to Prolonged Field Care section below for target urinary output and titration).
- If no IV solution available, use following improvised electrolyte solution to administer orally for patient with a TBSA under 30% (Use same administration/volume rate as IV administration):
    - Oral Rehydration Solution (as per package instructions) **OR**
    - 1 liter of potable water with 6 level teaspoons sugar and 0.5 level teaspoon salt

Prolonged Field Care:

- The main target is a urine output of 30-50mL/hr (0.5mL/kg/hr) for adult and 0.5mL/kg/hr to 1mL/kg/hr for pediatric patients. Urine output needs to be monitored hourly, and IV fluid rate should be titrated to achieve target urine output.
- If UOP > 50mL/hr, decrease IV fluid by 25% and reassess after 1hr.
- If < 30mL/kg, increase infusion volume by 25% for the next hour and reassess.
- The IV fluid should not exceed 1500mL/hr x 2hrs or a maximum of 250mL/kg in 24hrs to avoid over resuscitation/abdominal compartment syndrome.
- Antibiotics are not indicated for prophylaxis in the absence of open wounds. If after several days a cellulitis develops, contact the SMA.

Fluid Replacement Formula

Parkland Formula (for Pediatrics):

3 mL RL (or NS) x Weight in kg x TBSA with 2nd & 3rd degree burns as a % = total mL given in the first 24hrs.

$$\begin{array}{r} {}^{1}/_{2} \text{ in } 1^{\text{st}}\ 8\text{hrs} \\ {}^{1}/_{4} \text{ in } 2^{\text{nd}}\ 8\text{hrs} \\ {}^{1}/_{4} \text{ in } 3^{\text{rd}}\ 8\text{hrs} \\ \hline \text{Total over } 24\text{hrs} \end{array}$$

Example: Pt weighing 30kg with 36% TBSA

$$3\text{mL} \times 30\text{kg} \times 36 = {}^{3240\text{mL}}/_{24\text{hrs}}$$

$${}^{1}/_{2} \text{ in } 1^{\text{st}}\ 8\text{hrs} \rightarrow \frac{3240\text{mL}}{2} = 1620\text{mL}$$

$${}^{1}/_{4} \text{ in } 2^{\text{nd}}\ 8\text{hrs} \rightarrow \frac{3240\text{mL}}{4} = 810\text{mL}$$

$${}^{1}/_{4} \text{ in } 3^{\text{rd}}\ 8\text{hrs} \rightarrow \frac{3240\text{mL}}{4} = 810\text{mL}$$

- Pt would receive 1620mL in the first 8hrs, 810mL in the second 8hrs, and 810mL in the last 8hrs for a total of 3240mL in 24hrs.
- If fluid was given to treat Hypovolemic/Hemorrhagic Shock, that amount needs to be subtracted from the total volume that will be administered in the 1st 8hrs (e.g.: 1620 mL in the 1st 8hrs – 500 mL given for Hypovolemic/Hemorrhagic Shock = the new volume for the 1st 8hrs will be 1120mL).
- Refer to Prolonged Field Care section above, for target urine output and titration.

USAISR Rule of Ten (For Adults):

- Initial IV/IO fluid rate is calculated as:
  a. %TBSA x 10mL/hr (for adults weighing 40-80kg);
  b. For every 10kg ABOVE 80kg, increase initial rate by 100 mL/hr;
  c. Refer to Prolonged Field Care section above, for target urine output and titration.

8.27 Bladder Catheterization

(assisted skill unless ordered by SMA)

Indication:

- Patients who will be under care for an extended time period and who require urinary output monitoring.

Contraindication:

- Blood at meatus, perineal bruising, blood in scrotum, or suspected pelvic fracture.

Precaution:

- Physical resistance on insertion.

Procedure:

1. Explain procedure to patient.
2. Position patient on back with legs apart (knees bent for females).
3. Ensure aseptic technique (if possible, to prevent contamination of catheter).
4. Prepare equipment.
5. Expose genitalia and clean with Betadine swabs (dispose after each wipe):
    a. **Females**: With the non-dominant hand, retract labia to expose urethral meatus and maintain this position throughout the procedure. Clean labia and urinary meatus from clitoris toward anus. Clean by wiping far labial fold, near labial fold, and directly over center of urethral meatus.
    b. **Males**: With the non-dominant hand, grasp penis at the shaft, just below glans. Retract foreskin (If not circumcised) and maintain hand in this position throughout procedure. Wipe in a circular motion from urethral meatus to base of glans. Repeat 3 times.
6. Hold catheter in the dominant hand (using sterile glove) about 7.5 - 10cm from tip. Dip exposed tip in lubricant and insert into urethra. In males, hold penis at 60 degrees to patient's body and apply light traction. Advance catheter 5 - 7.5cm (for female), 17 - 22.5cm (for male) or until urine flow and then advance a further 2.5 - 5cm.
7. Inflate balloon with recommended volume of sterile water (marked on the balloon port). Sterile water is preferred and should be utilized, when possible, to reduce irritation and help to keep the catheter stable with pressure variations that can occur during evacuation by air. In the absence of sterile water, the following products are acceptable (use the same amount as sterile water): Normal saline for AIREVAC; Air for ground transportation.
8. Secure catheter to bag, tape catheter to leg allowing some slack in catheter.
9. Monitor urine output hourly.

The patient may feel the urge to urinate or experience the sensation that the catheter will slip out. This is not abnormal and will typically disappear in about 30 minutes.

8.28 Catheterization Urinary Output Calculations

- Adult ≥ 0.5mL/kg/hr
- Child = 0.5 -1mL/kg/hr

Example:

- Adult Weight = 72kg

$$\frac{(\text{adult})0.5\text{mL} \times 70\text{kg}}{1\text{hr}} = \frac{35\text{mL}}{\text{hr}}\,\text{urinary output}$$

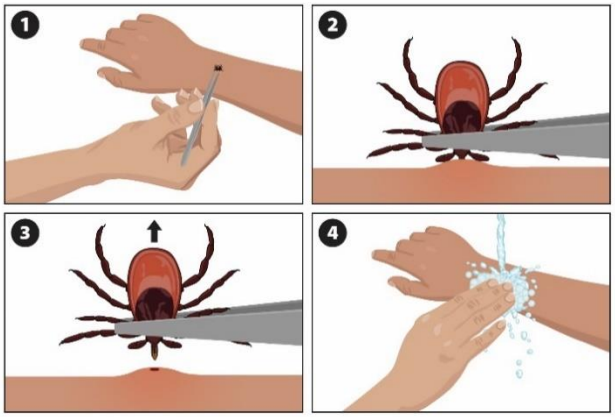
- Child Weight = 12kg

$$\frac{(\text{child})1\text{mL} \times 12\text{kg}}{1\text{hr}} = \frac{12\text{mL}}{\text{hr}}\,\text{urinary output (upt to } {}^{35\text{mL}}/_{\text{hr}})$$

8.29 Tick Removal Procedure

Procedure:

1. Firmly grasp the tick with fine-tipped forceps (or hook designed for tick removal), closest to the skin at a 90-degree angle;
2. Horizontally pull slowly and steadily with the forceps straight out from the skin
3. **Do Not** twist or squeeze the tick.
4. Wash the area with soap and water or cleanse the area with alcohol-based sanitizer
5. Dry off the area well.
6. Watch for signs of infection



Disposing of Ticks

Kill the tick before disposing of it by drowning it in rubbing alcohol or by freezing it for several days. Avoid squashing ticks with bare fingers as infection may enter through breaks in your skin, such as close to the fingernail.

Early Signs of Lyme Disease

- rash*
- fever
- chills
- fatigue
- headache
- swollen lymph nodes
- muscle and joint aches

*This rash is called an Erythema Migrans Rash. It's the more commonly reported sign of Lyme disease. It's an expanding skin rash that typically begins at the site of the tick bite. It slowly grows to more than 5 cm in diameter over several days and can sometimes: be circular or oval-shaped look like a target or bull's eye go unnoticed, especially if it's on: dark skin a part of the body that's difficult to see some people may not develop a rash.

8.30 Medical Evacuation Request (MEDEVAC 9-Linear)

PREFIX	DESCRIPTION / NOTES	MESSAGE CONTENT
1	**Call Sign To / From**	_____This is_____
	Warning Order	MEDEVAC 9-LINER
2	**Location**	
	GRID of Pick-Up Zone	
3	**Number of Patients / Priority**	P1 = P2 = P3 =
	PRIORITY 1 (P1) Urgent. To be hospitalized within 60 minutes / PRIORITY 2 (P2) To be hospitalized within 4 hours / PRIORITY 3 (P3) To be hospitalized within 24 hours (R2/R3)	
4	**Special Equipment Required**	
	None; Hoist; Ventilator; Extraction Device	
5	**Patient / Type**	S = W = E = O =
	S (Stretcher) / W (Walking) / E (Escort) / O (Other, Give details)	
6	**Security at Pick-Up Zone**	
	N (No enemy) / P (Possible enemy) / E (Enemy in area) / X (Hot, Armed escort required)	
7	**Pick-Up Zone Marking Method**	
	How will zone be marked: Smoke; Light; etc. (Include colour)	
8	**Patients by Nationality / Status**	A: NATO military = B: NATO civilian = C: Non-NATO military = D: Non-NATO civilian = E: Detainee, POW = F: Embedded interpreter = G: Civ Cas caused by FF = H: Child =
	NOTE: POW = Prisoner of War; FF = Friendly Forces; Cov Cas = Civilian Casualties	
9	**Tactical Considerations and other info**	
	Give details of any changes to the tactical situation and any other relevant information	

8.31 Transfer of Care

These formats are to be adopted in order to standardize the method of providing receiving medical personnel with casualty's information.

Patient Report
Ensure a written report is given upon transfer of care.
Provide the receiving medical personnel with the following information:

- Age and gender
- Patient's C/C
- History of C/C
- History of vital signs
- Medical history if available
- Medications
- Allergies
- Relevant physical exam findings
- Treatment, Protocols used and effectiveness.

MIST-AT
Ensure a written report is given upon transfer of care.
Depending on the environment or context (e.g. AIREVAC, Combat Environment) MIST-AT format can be used as a rapid handover to give to receiving medical personal on the casualty (Reference 8.30 MEDEVAC Request):

M: Mechanism of injury
I: Injury or Illness Sustained
S: Symptoms and Vital Signs
T: Treatment Given
A: Age of Casualty
T: Time of Wounding

A casualty's identity is not sent in clear. Each soldier should have an identification code (Or "ZAP" number). If the casualty is a local national some means of differentiating casualties should be used, e.g. Casualty #1.

8.32 Care Under Fire/Threat (CUF)

Definition:

- "Care Under Fire" (CUF) outlines a strategy for simultaneously rendering care to a casualty while managing a tactical situation/threat in a hostile/combat environment. Optimal care to the injured is balanced against the threat of creating additional casualties or compromising mission success.

General Principles:

- Perform only lifesaving interventions that are tactically feasible and practical given the situation to address preventable causes of death on the battlefield (Refer to steps in CUF).
- The best medicine on the battlefield is fire superiority and preventing further casualties.
- Typically, in CUF, available medical equipment/resources are limited to those carried by the casualty or by the medical provider and are immediately accessible.
- Situations where a CUF approach is indicated include (but are not limited to):
  - While actively engaged by hostile/effective fire (direct or indirect);
  - Casualty in a burning building/ vehicle;
  - Following detonation of an explosive device where there is a real threat of secondary devices at the location of the "X";
  - In any location where a threat makes evacuation/extraction a priority and where there is significant risk to providing medical care in that location. (This can also include non-combat situations e.g.: exposure to a CBRN agent; environmental threats; high angle rescue; etc.).

Steps:

1. Update your tactical awareness.
2. Return fire and take cover.
3. Direct or expect casualty to remain engaged as a combatant if appropriate.
4. Direct casualty to move to cover and apply self-aid if able.
5. When tactically feasible and if required, move or drag casualty to cover (Tactical Rescue).
6. Try to keep the casualty from sustaining additional wounds.
7. Consider establishing a TFC Bubble[1] if conditions permit.
8. Casualties should be extracted from burning vehicles or buildings and moved to places of relative safety. Do what is necessary to stop the burning process.
9. Stop life-threatening external hemorrhage if tactically feasible:
10. Direct casualty to control hemorrhage by self-aid if able;
11. Use an Operational Medicine Working Group recommended limb tourniquet for hemorrhage that is anatomically amenable to tourniquet use;
12. Apply the limb tourniquet over the uniform clearly proximal to the bleeding site(s). If the site of the life-threatening bleeding is not readily apparent, place the tourniquet "high and tight" (As proximal as possible) on the injured limb and move the casualty to cover.
13. Airway Management:
14. Airway management is generally best deferred until the Tactical Field Care (TFC) phase, but;
15. If in proximity to, and tactically feasible, roll casualties with an altered level of consciousness into the recovery position.
16. Go to steps 1 through 3

---

1. TFC Bubble:

In order for a care provider to establish a TFC Bubble the following conditions must be satisfied:

1. The situation surrounding the care provider and casualty, including individuals in proximity to them and potentially sharing the same cover, are actively engaged in combat and are operating in a "Care Under Fire" environment.
2. The care provider is not required to contribute to the engagement due to and adequate volume of outgoing fire and effective enemy suppression.
3. The care provider and the casualty are in a position of adequate cover.
4. The casualty will likely benefit from Tactical Field Care interventions.

8.33 Tactical Field Care

The sequence of the clinical approach outlined in TFC (MARCHE) supersedes any reference to the sequence of interventions contained in individual protocols in this manual.

NB: The following Tactical Field Care description and sequence is a compilation of a number of references 1. Despite being predominantly formulated using the Tactical Medical Guidelines for Canadian Forces Medical Technicians (TACMED Guidelines), it should NOT be considered a reproduction or replacement of the former.

Definition:
"Tactical Field Care" (TFC) is the care rendered once the casualty, the care provider and their unit are no longer under effective hostile fire *(or direct threat)*. It also applies to situations in which an injury has occurred on a mission, but hostile fire *(or direct threat)* has not yet been encountered. Equipment is limited to that which is carried by the care provider, casualty and their team.

Simplification – Not during active combat or Under Direct Threat.

MARCHE is used within these steps. The acronym does not however comprehensively cover all the steps that need to be taken in Tactical Field Care.

1. Update your Tactical Awareness.
2. Ensure adequate security prior to attendance to the casualty(ies).
3. Consider early placement of the casualty on a litter if rapid movement is anticipated.
4. A sharps and garbage management plan should be established as SOP.
5. Casualties with an altered mental status should be disarmed immediately and their radios turned off.
6. Find the Mechanism of Injury (MOI).
7. Consideration for spinal precautions:
    a. Casualties with penetrating trauma to the head and neck do not routinely benefit from C-spine immobilization and these precautions are generally **not recommended in the tactical environment**.
    b. **In Class B environment**, Spinal Motion Restriction (SMR) should be applied appropriately, **if equipment is available and tactically feasible,** to a casualty who has indicators that they may have sustained or are at high risk for spine injuries, or who cannot be adequately assessed clinically due to an altered level of consciousness. If so, care should be directed to the C-spine with a recommended device;
    c. Attention to the spine should be standard for all casualties with a mechanism of injury presenting a higher risk for spinal injury as per below but not limited to:
        i. Mechanism of injury presenting a higher risk for spinal injury as per below (but not limited to):
            1. High Speed MVC
            2. Fall > Three Times Casualty's Height (No FFO)
            3. Fall from a height > 1m when FFO on
            4. Axial Load
            5. Diving Accidents
            6. Penetrating Wound In or Near Spinal Column
            7. Sports Injuries to Head or Neck
            8. Unconscious Trauma casualty
            9. History of blast trauma
        ii. And/Or Signs/Symptoms of:
            1. Spinal Pain or Tenderness
            2. Abnormal Motor & Sensory Exam
        iii. And Unreliable Patient:
            1. Acute Stress Reaction
            2. Head/Brain Injury
            3. Altered Mental Status
            4. Intoxication with Drugs/Alcohol
            5. Other Distracting Injuries
    d. If equipment not available and/or tactically not feasible, careful movement of the casualty with particular attention to the spine should be standard.

8. **Massive Hemorrhage Control**
    a. Refer to Protocol 3.1 Massive External Hemorrhage
    b. Refer to Protocol 3.6 Other Sources of External Hemorrhage
    c. Refer to Reference 8.3 Assessing & Treating Hemorrhage
9. **Airway Management**
    a. Refer to Protocol 2.1 Airway Algorithm;
    b. Refer to Standard Medical Procedures & References:
        i. Supraglottic Airway Insertion Principles
        ii. Cricothyroidotomy
    c. Refer to Standard Medical Procedures & References: 8.12 Airway Management Principles;
    d. Additional Information:
        i. Casualties with penetrating trauma to the head and neck do not routinely benefit from C-spine immobilization and these precautions are generally not recommended in the tactical environment.
10. **Respiratory Management**
    a. Refer to Protocol 3.14 Chest Trauma Management;
    b. Refer to Standard Medical Procedures & References: 8.16 Chest Trauma Management.
11. **STOP**
    a. **S**ituational Awareness Update;
    b. **T**riage all other casualties – ensure MAR is completed on casualties at CCP. If MASCALS then conduct triage as per START triage method;
    c. **O**ngoing documentation and Triage cards;
    d. **P**ass up and Pull pertinent information for 9-Liner MEDEVAC Request and MIST-AT Report. (Reference 8.30 9-Liner MEDEVAC Request and Reference 8.1 MIST-AT Report).
12. **Cooling Prevention & Litter Placement**
    a. If a spinal injury is suspected, initiate proper Spinal Motion Restriction if tactical situation permits it;
    b. If indicated and not done already, apply a pelvic binder before moving the casualty;
    c. Minimize casualty's exposure to the elements;
    d. Remove wet clothing;
    e. If not compromising respiratory effectiveness, keep protective gear on the casualty. Otherwise, keep the protective gear with the casualty;
    f. Place casualty on a litter to facilitate rapid movement if required. Place on an insulation pad and wrap in a recommended or other appropriate casualty blanket if available.
13. **Circulation (B.I.F.T.)**
    a. Bleeding Control:
        i. Perform a quick rapid body survey to find other sources of bleeding.
        ii. Control all sources of bleeding.
        iii. Splint femur fractures using a recommended traction device if available.
    b. IV Access:
        i. Refer to Standard Medical Procedures:
            1. 8.21 Saline Lock
            2. 8.22 Intraosseous Access
    c. Fluid Resuscitation:
        i. Refer to Protocols:
            1. 3.3 Hemorrhagic Shock Pediatric
            2. 3.4 Hemorrhagic Shock Adult
            3. 3.5 Blood Protocol (if available/authorized)
            4. 3.7 Burn Management
            5. 3.12 Severe Traumatic Brain Injury
        ii. Refer to Standard Medical Procedures:
            1. 8.23 IV Flow Calculation
            2. 8.24 IV Drip Rates
    d. Tourniquet Assessment, Conversion & Removal:
        i. Refer to Protocol 3.2 Tourniquet Assessment, Replacement or Conversion.
        ii. Refer to Standard Medical Procedure 8.2 Tourniquet Assessment, Replacement or Conversion
14. **Hypothermia**
    a. Refer to Protocol 5.1 Hypothermia.

15. **Head Injury**
    a. Refer to Protocol 3.12 Severe Traumatic Brain Injury;
    b. Additional Information:
        i. Serial assessments are vital. Patients with a mildly impaired neurologic status may rapidly deteriorate due to expanding intracranial hematomas or increasing cerebral swelling.
16. **Penetrating Eye Injury**
    a. Refer to Protocol 3.13 Eye Injury;
    b. Refer to Reference 8.19 Eye Trauma Principles & Management.
17. **Everything Else (M-PHAAT-D)**
    a. **M**onitoring:
        i. Pulse Oximetry; Blood Pressure; Heart Rate; Breathing Rate; Blood Glucose; Temperature.
        ii. Don't forget to update your MIST-AT (or other types of documentation).
    b. **P**ain Management:
        i. Refer to Protocol 3.8 Pediatric Pain, 3.9 Adult Pain Management or 3.10 Penthrox Pain
    c. **H**ead to toe:
        i. Expose and examine for additional wounds and fractures.
        ii. The exam should consist of inspection, auscultation, palpation, and sometimes percussion.
        iii. Remove and replace clothing (or blanket) and equipment as required (Hypothermia prevention & Protection).
        iv. Refer to Protocol 3.11 Concussion mTBI Management
    d. **A**ddress all wounds and fractures:
        i. Refer to Military First Aid / ITLS.
        ii. Refer to Protocol 3.7 Burn Management.
        iii. Refer to Reference 8.26 Burn Assessment & Fluid Replacement Principles.
    e. **A**ntibiotics:
        i. Refer to Protocol 4.2 Antibiotic.
        ii. Refer to Standard Medical Procedures 8.25 Medication Calculations, Reconstitutions & Dilutions.
    f. **T**actical Evacuation Preparation:
        i. For AIREVAC, secure any potential foreign object debris (FOD) around the casualty including blankets, casualty card and garbage/sharps.
        ii. Ensure mission essential equipment, explosives, fuel soaked clothing and other hazards are removed from the casualty and their weapon has been cleared if it is accompanying them. Leave PPE and weapon with ammunition with the casualty. As a general rule, crew serve weapons and ammunition remain with the unit. The decision to swap weapons or remove additional ammunition from the casualty will rest with the senior tactical commander on the ground.
        iii. Secure casualty and blankets to the litter and protect the casualty from hypothermia, including insulation from the ground/floor.
        iv. Protect the casualty with goggles, ear plugs, cover mouth and nose and other measures from brown out and aircraft noise.
        v. Provide instructions to ambulatory patients as needed.
    g. **D**ocumentation of Care:
        i. Document clinical assessments, treatments rendered and changes in the casualty's status on the approved casualty card. Forward this information with the casualty to the next level of care.
        ii. If not done already, update and send the MIST-AT

PHTLS (9th Edition, 2021); JTS/CoTCCC TCCC Guidelines for Med. Pers. (Nov. 2020); Approved TACMED Guidelines for CAF Med. Techs. (Oct. 2017); ITLS (8th Edition, 2016); Relevant Joint Trauma System Clinical Practice Guidelines (consulted May 202

8.34 CBRN Casualty Assessment – CRESS

CRESS is the NATO method for CBRN Casualty Assessment developed by toxicology and CBRN medical experts in UK SOF. It is a very helpful tool that will lead the Tactical Medic to quickly determine agent of concern, conduct triage, and recognize symptoms.

C – Consciousness (unconscious, convulsing, altered?)

R – Respirations (present, labored, or absent?)

E – Eyes (pupil size, PERRLA?)

S – Secretions (absent, normal, increased?)

S – Skin (diaphoretic, cyanotic, dry, hot?)

"CRESS" from NATO Management of CBRN Casualties Handbook AMedP-7.1

Notes: For example, a severe nerve agent casualty would present as unconscious and seizing; absent respirations; miosis and dim vision; excessive secretions; diaphoretic and cyanotic. Compared to a Mustard casualty presenting as conscious; labored (delayed); gritty eye sensation progressing to redness, severe swelling, and blindness; normal secretions, normal skin progressing to redness with delayed onset blisters and pain. Remember to take into account the effects of associated trauma with poisoning may mask or confuse the CRESS assessment.

8.35 CBRN Casualty Approach – (MARCHE)² or M²A²R²C²H²E²

Goals of CBRN Trauma Medicine:

1. Limit and Minimize Exposure and Contamination
2. Treat the Immediate Life Threat
3. Administer Appropriate Antidotes, Countermeasures, utilize (MARCHE)²

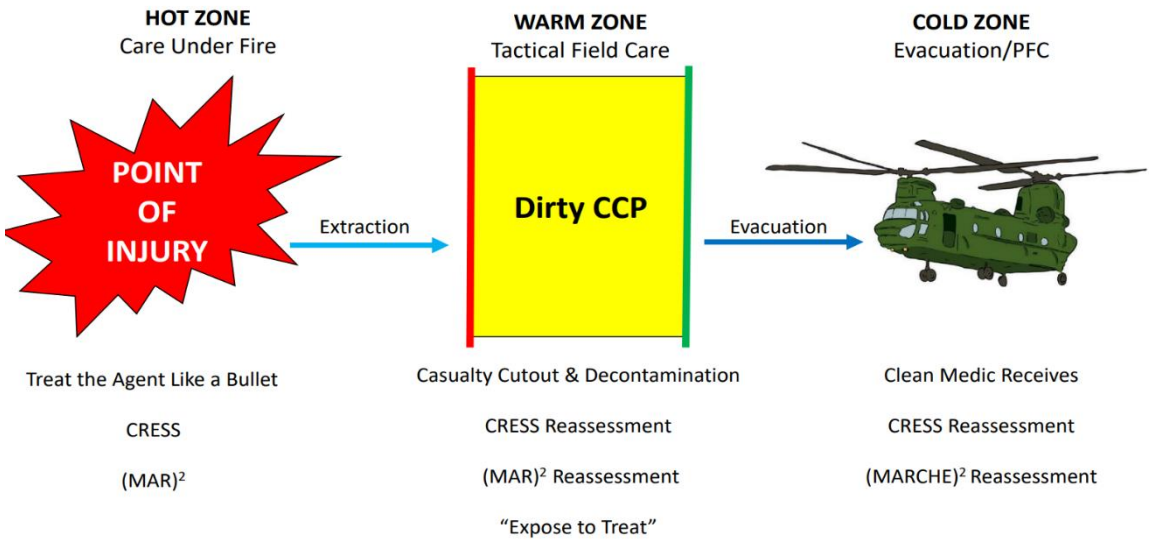
Point of Injury

- **M**assive Hemorrhage, **M**ask/Air Check
- **A**irway, Administer **A**ntidotes (ATNAA, CANA)
- **R**espirations, **R**apid Spot Decontamination (RSDL)

Move to EPDS or Dirty CCP if able

- **C**irculation, Administer **C**ountermeasures
- **H**ypothermia / **H**ead Wound
- **E**xtraction / **E**vacuation

Notes: CBRN Casualties take twice as long to treat as conventional wartime casualties. Reasons for this are the added complexity of working in PPE and the complexity of CBRN Trauma and Poisoning. Therefore (MARCHE)² "Marche Squared" or via the distributive property M²A²R²C²H²E² Limiting exposure and the catastrophic impacts of hypothermia will be some of the Combat Medic's biggest hurdles



8.36 Glasgow Coma Scale

Eye Opening	**Adult and Children ≥ 4 years**	**Children < 4 years**
4	Spontaneously	Spontaneously
3	To command	To command
2	To pain	To pain
1	No response	No response
Best Verbal Response	**Adult and Children ≥ 4 years**	**Children < 4 years**
5	Oriented	Appropriate words, social interaction*, fixes, follows
4	Confused	Cries but consolable
3	Inappropriate words	Persistently irritable
2	Incomprehensible	Restless, agitated
1	No response	No response
**** related to age: smiling; babbling; cooing***		
Best Motor Response	**Adult and Children ≥ 4 years**	**Children < 4 years**
6	Obeys commands	Spontaneous, purposeful
5	Localizes pain	Localises pain
4	Withdraws from pain	Flexion withdrawal
3	Abnormal flexion	Abnormal flexion
2	Extension	Extension
1	No response	No response

8.37 MACE 2

MHS Military Health System
health.mil

MACE 2

Military Acute Concussion Evaluation

Use MACE 2 as close to time of injury as possible.

Service Member Name: _____

DoDI/EDIPI/SSN: _____ Branch of Service & Unit: _____

Date of Injury: _____ Time of Injury: _____

Examiner: _____

Date of Evaluation: _____ Time of Evaluation: _____

Purpose: MACE 2 is a multimodal tool that assists providers in the assessment and diagnosis of concussion. The scoring, coding and steps to take after completion are found at the end of the MACE 2.

Timing: MACE 2 is most effective when used as close to the time of injury as possible. The MACE 2 may be repeated to evaluate recovery.

RED FLAGS

Evaluate for red flags in patients with Glasgow Coma Scale (GCS) 13-15.

- ❑ Deteriorating level of consciousness
- ❑ Double vision
- ❑ Increased restlessness, combative or agitated behavior
- ❑ Repeat vomiting
- ❑ Results from a structural brain injury detection device (if available)
- ❑ Seizures
- ❑ Weakness or tingling in arms or legs
- ❑ Severe or worsening headache

Defer MACE 2 if any red flags are present. Immediately consult higher level of care and consider urgent evacuation according to evacuation precedence/Tactical Combat Casualty Care (TCCC).

- ❑ **Negative for all red flags**
  Continue MACE 2, and observe for red flags throughout evaluation.

MILITARY ACUTE CONCUSSION SCREENING

Complete this section to determine if there was an injury event AND an alteration of consciousness or memory.

1. Description of Incident

A. Record the event as described by the service member or witness.

Use open-ended questions to get as much detail as possible.

Key questions:

- ❑ Can you tell me what you remember?
- ❑ What happened?
- ❑ Who were you last with?

B. Observable Signs

At the time of injury were any of these observable signs witnessed?
Visual clues that suggest a possible concussion include:

- ❑ Lying motionless on the ground
- ❑ Slow to get up after a direct or indirect blow to the head
- ❑ Disorientation, confusion, or an inability to respond appropriately to questions
- ❑ Blank or vacant look
- ❑ Balance difficulties, stumbling, or slow labored movements
- ❑ Facial injury after head trauma
- ❑ Negative for all observable signs

C. Record the type of event.

Check all that apply:

☐ Blunt object ☐ Sports injury ☐ Gunshot wound

☐ Fall ☐ Assault ☐ Explosion/blast Estimated distance _____

☐ Fragment ☐ Motor vehicle crash ☐ Other _____

D. Was there a blow or jolt to the head?

- ❑ Did your head hit any objects?
- ❑ Did any objects strike your head?
- ❑ Did you feel a blast wave? (A blast wave that is felt striking the body or head is considered a blow to the head.)
- ❑ Did you have a head acceleration or deceleration?

☐ **YES** ☐ **NO** ☐ **UNKNOWN**

2. Alteration of Consciousness or Memory

A. Was there alteration of consciousness (AOC)?

AOC is temporary confusion or "having your bell rung."

☐ YES ☐ NO

If yes, for how long? _____ seconds _____ minutes

☐ UNKNOWN

Key questions:

- ❑ Were you dazed, confused, or did you "see stars" immediately after the event?
- ❑ Did you feel like you were in a fog, slowed down, or "something was not right"?

B. Was there loss of consciousness (LOC)?

LOC is temporarily passing out or blacking out.

☐ YES ☐ NO

If yes, for how long? _____ seconds _____ minutes

☐ UNKNOWN

Key questions:

- ❑ Did you pass out or black out?
- ❑ Is there a period of time you cannot account for?

C. Was there any post traumatic amnesia (PTA)?

PTA is a problem remembering part or all of the injury events.

☐ YES ☐ NO

If yes, for how long? _____ seconds _____ minutes

☐ UNKNOWN

Key questions:

- ❑ Is there a period of time you cannot account for?
- ❑ What is the last thing you remember before the event?
- ❑ What is the first thing you remember after the event?

D. Was the AOC, LOC or PTA witnessed?

☐ YES ☐ NO

If yes, for how long? _____ seconds _____ minutes

☐ UNKNOWN

Tips for assessment:

- ❑ Ask witness to verify AOC, LOC or PTA and estimate duration.

3. Symptoms

Common symptoms after a concussion are listed below. For this event, check all that apply.

- ❑ Headache
- ❑ Dizziness
- ❑ Memory problems
- ❑ Balance problems
- ❑ Nausea/vomiting
- ❑ Difficulty concentrating
- ❑ Irritability
- ❑ Visual disturbances
- ❑ Ringing in the ears
- ❑ Other _____
- ❑ **Negative for all symptoms**

4. History

A. During the past 12 months, were you diagnosed with a concussion, not counting this event?

☐ YES ☐ NO

If yes, how many? ____

☐ UNKNOWN

B. History of diagnosed/treated headache disorder or migraine.

☐ YES ☐ NO

C. History of depression, anxiety, or other behavioral health concerns.

☐ YES ☐ NO

CONCUSSION SCREENING RESULTS (Possible Concussion?)

Was there a blow or jolt to the head (1D)
AND
ANY alteration of consciousness or memory? (2A,2B,2C,or 2D)

YES (to both) ⬇

POSITIVE CONCUSSION SCREEN:

1. **Continue** MACE 2.
2. Complete evaluation before prescribing rest.
3. Communicate findings to line leadership.
4. Document and code findings in electronic health record (EHR).

NO (to either or both) ⬇

NEGATIVE CONCUSSION SCREEN:

1. **Stop** MACE 2.
2. Initiate 24 hour-rest period, if deployed. During rest, avoid activities that worsen symptoms. Follow up with service member in accordance with the Progressive Return to Activity (PRA).
3. Communicate findings to line leadership.
4. Document and code findings in electronic health record (EHR).

COGNITIVE EXAM

5. Orientation

Score one point for each correct response.

Ask This Question	Incorrect	Correct
"What month is this?"	0	1
"What is the date or day of the month?"	0	1
"What day of the week is it?"	0	1
"What year is it?"	0	1
"What time do you think it is?"	0	1
Correct response must be within one hour of actual time.		

ORIENTATION TOTAL SCORE ____/5

6. Immediate Memory

Choose one list (A-F below) and use that list for the remainder of the MACE 2.

Read the script for each trial and then read all five words. Circle the response for each word for each trial. Repeat the trial three times, even if the service member scores perfectly on any of the trials.

Trial 1 script: Read the script exactly as written.

- *"I am going to test your memory. I will read you a list of words and when I am done, repeat back to me as many words as you can remember, in any order."*

Trials 2 and 3 script: Read the script exactly as written.

- *"I am going to repeat that list again. Repeat back to me as many words as you can remember, in any order, even if you said them before."*

	Trial 1		Trial 2		Trial 3	
List A	Incorrect	Correct	Incorrect	Correct	Incorrect	Correct
Jacket	0	1	0	1	0	1
Arrow	0	1	0	1	0	1
Pepper	0	1	0	1	0	1
Cotton	0	1	0	1	0	1
Movie	0	1	0	1	0	1

IMMEDIATE MEMORY TOTAL SCORE ____/15

Immediate Memory Alternate Word Lists

List B	List C	List D	List E	List F
Dollar	Finger	Baby	Candle	Elbow
Honey	Penny	Monkey	Paper	Apple
Mirror	Blanket	Perfume	Sugar	Carpet
Saddle	Lemon	Sunset	Sandwich	Saddle
Anchor	Insect	Iron	Wagon	Bubble

NEUROLOGICAL EXAM

7. Speech Fluency

- ☐ Normal
- ☐ Abnormal

- Speech should be fluid and effortless – no pauses or unnatural breaks.
  - Stuttering or struggling to speak is abnormal.

8. Word Finding

- ☐ Normal
- ☐ Abnormal

- Assess difficulties with word finding:
  - Difficulty in coming up with the name of an object or grasping to find words is abnormal.

9. Grip Strength

- ☐ Normal
- ☐ Abnormal

- Assess grip strength. Grip strength should be strong and equal bilaterally.
  - Unequal or weak grip strength is abnormal.

10. Pronator Drift

- ☐ Normal
- ☐ Abnormal

- Direct service member to stand with eyes closed and arms extended forward, parallel to the ground with palms up. Assess for five to 10 seconds:
  - Any arm or palm drift is abnormal.

11. Single Leg Stance

- ☐ Normal
- ☐ Abnormal

- Remove shoes if possible. Have service member stand on one leg, arms across chest, hands touching shoulders, eyes open initially. Once service member is balanced, have them close their eyes and time for 15 seconds how long they can maintain their balance. Repeat test with opposite leg.
  - Loss of balance on either leg before eight seconds is abnormal.

NEUROLOGICAL EXAM - Continued

12. Tandem Gait

☐ Normal
☐ Abnormal

- Remove shoes if possible. Have service member take six steps one foot in front of the other, heel-to-toe, with arms at side
  - Stumbling or shifting feet is

13. Pupil Response

☐ Normal
☐ Abnormal

- Pupils should be round, equal in size and briskly constrict to a direct, bright light.
  - Unequal pupil size, dilation or constriction delay is abnormal.

14. Eye Tracking

☐ Normal
☐ Abnormal

- Both eyes should smoothly track your finger side-to-side and up and down.
  - Unequal, irregular or delayed eye tracking is abnormal.

NEUROLOGICAL EXAM RESULTS (Questions 7-14)

☐ All Normal ☐ Any Abnormal

COGNITIVE EXAM

15. Concentration

A. Reverse Digits

Read the script and begin the trial by reading the first string of numbers in Trial 1.

Circle the response for each string.

- If correct on string length of Trial 1, proceed to the next longer string length in the same column.
- If incorrect on string length of Trial 1, move to the same string length of Trial 2.
- If incorrect on both string lengths in Trials 1 and 2, **STOP** and record score as zero for that string length. Record total score as sum of previous correct trials.

COGNITIVE EXAM - Continued

15. Concentration - Continued

A. Reverse Digits

Script: Read the script exactly as written.

- *"I am going to read you a string of numbers. When I am finished, repeat them back to me backward. That is, in reverse order of how I read them to you. For example, if I said 7 - 1 - 9, then you would say 9 - 1 - 7."*

List A			
Trial 1	**Trial 2** (if Trial 1 is incorrect)	**Incorrect**	**Correct**
4-9-3	6-2-9	**0**	**1**
3-8-1-4	3-2-7-9	**0**	**1**
6-2-9-7-1	1-5-2-8-5	**0**	**1**
7-1-8-4-6-3	5-3-9-1-4-8	**0**	**1**

REVERSE DIGITS SCORE (15A) ____/4

Concentration Alternate Number Lists

Note: Use the same list (A-F) that was used in Question 6.

List B	
Trial 1	**Trial 2**
5-2-6	4-1-5
1-7-9-5	4-9-6-8
4-8-5-2-7	6-1-8-4-3
8-3-1-9-6-4	7-2-7-8-5-6

List C	
Trial 1	**Trial 2**
1-4-2	6-5-8
6-8-3-1	3-4-8-1
4-9-1-5-3	6-8-2-5-1
3-7-6-5-1-9	9-2-6-5-1-4

List D	
Trial 1	**Trial 2**
7-8-2	9-2-6
4-1-8-3	9-7-2-3
1-7-9-2-6	4-1-7-5-2
2-6-4-8-1-7	8-4-1-9-3-5

List E	
Trial 1	**Trial 2**
3-8-2	5-1-8
2-7-9-3	2-1-6-9
4-1-8-6-9	9-4-1-7-5
6-9-7-3-8-2	4-2-7-9-3-8

List F	
Trial 1	**Trial 2**
2-7-1	4-7-9
1-6-8-3	3-9-2-4
2-4-7-5-8	8-3-9-6-4
5-8-6-2-4-9	3-1-7-8-2-6

COGNITIVE EXAM - Continued

15. Concentration - Continued

B. Months in Reverse Order

Script: Read the script exactly as written.

- *"Now tell me the months of the year in reverse order. Start with the last month and go backward. So you'll say: December, November...Go ahead."*

Correct Response:

Dec – Nov – Oct – Sep – Aug – Jul – Jun – May – Apr – Mar – Feb – Jan

	Incorrect	Correct
ALL months in reverse order	0	1

MONTHS IN REVERSE ORDER (15B) ____/1

CONCENTRATION TOTAL SCORE ____/5

Sum of scores:
15A (0-4 points) and 15B (0 or 1 point)

16. Delayed Recall

Read the script and circle the response for each word. Do NOT repeat the word list.
Note: Use the same list (A-F) that was used in

Script: Read the script exactly as written.

- *"Do you remember that list of words I read a few minutes earlier? I want you to tell me as many words from that list as you can remember. You can say them in any order."*

List A	Incorrect	Correct
Jacket	0	1
Arrow	0	1
Pepper	0	1
Cotton	0	1
Movie	0	1

DELAYED RECALL TOTAL SCORE ____/5

Delayed Recall Alternate Word Lists

List B	List C	List D	List E	List F
Dollar	Finger	Baby	Candle	Elbow
Honey	Penny	Monkey	Paper	Apple
Mirror	Blanket	Perfume	Sugar	Carpet
Saddle	Lemon	Sunset	Sandwich	Saddle
Anchor	Insect	Iron	Wagon	Bubble

17. Vestibular/Ocular-Motor Screening (VOMS) for Concussion Instructions

VOMS Contraindication: Unstable Cervical Spine.

Consider defering VOMS if patient is overtly symptomatic or a trained provider unavailable. VOMS should be completed before return to duty. Use comment section for any provider-observed difficulty with specific VOMS tasks.

A. Baseline symptoms. Record headache, dizziness, nausea and fogginess (HDNF), on zero to 10 scale prior to screening.

B. Smooth pursuits. Service member and examiner are seated. Hold fingertip three feet from patient. Service member focuses on fingertip target as examiner moves fingertip smoothly horizontally one and a half feet right and left of midline at rate requiring two seconds to go fully from left to right and right to left. Perform twice. Repeat in vertical direction one and a half feet above and one and a half feet below midline up and down, moving eyes two seconds fully up and two seconds down. Perform twice. Record HDNF on a zero to 10 scale.

C. Saccades. Service member and examiner are seated.

1) **Horizontal saccades:** Hold two fingertips horizontally at a distance of three feet from service member, and one and a half feet left and right of midline so service member gazes 30 degrees left and right. Service member moves eyes as quickly as possible from point to point. Perform 10 times. Record HDNF on a zero to 10 scale.
2) **Vertical saccades:** Repeat with two fingertips vertically three feet from service member, and one and a half feet above and below midline so service member gazes 30 degrees upward and downward. Service member moves eyes as quickly as possible from point to point. Perform 10 times. Record HDNF on a zero to 10 scale.

D. Convergence. Service member and provider are seated facing each other. Service member focuses on font target (page 14) at arm's length and slowly brings toward tip of nose. Service member stops target when two distinct images seen or when outward deviation of eye observed. Repeat and measure three times. Record centimeters between target and tip of nose for each trial. A near point of convergence ≥ five centimeters from the tip of the nose is considered abnormal. Record HDNF on a zero to 10 scale.

17. Vestibular/Ocular-Motor Screening (VOMS) for Concussion Instructions (Continued)

E. Vestibular-ocular reflex (VOR) test. Service member and examiner are seated. Examiner holds font target (page 14) in front of service member in midline at three feet, rotation speed set with metronome.

1) **Horizontal VOR test:** Service member rotates head horizontally focusing on target at 20 degrees to each side. Rotation = 180 beats per minute (bpm). Perform 10 times. Record: HDNF 10 seconds after test.

2) **Vertical VOR test:** Repeat test moving head vertically 20 degrees up and down at 180 bpm. Perform 10 times. Record HDNF 10 seconds after test.

F. Visual motion sensitivity (VMS) test. Service member stands with feet shoulder width apart, facing a busy area. Examiner stands next to and slightly behind service member. Service member outstretches arm. Focusing on their thumb, the service member rotates head,eyes and trunk as unit 80 degrees right and left. Rotation = 50 bpm. Perform five times. Record HDNF on a zero to 10 scale.

17. VOMS Score Card

Vestibular/Ocular Motor Test:	Not Tested	Headache 0-10	Dizziness 0-10	Nausea 0-10	Fogginess 0-10	Comments
BASELINE SYMPTOMS:	N/A					
Smooth Pursuits						
Saccades – Horizontal						
Saccades – Vertical						
Convergence (Near Point)						(Near Point in cm): Measure 1: _____ Measure 2: _____ Measure 3: _____
VOR – Horizontal						
VOR – Vertical						
Visual Motion Sensitivity Test						
Total						

Any score above baseline is considered abnormal

VOMS RESULTS

☐ All Normal ☐ Any Abnormal

EXAM SUMMARY

Record the data for correct MACE 2 documentation.

Cognitive Summary

Orientation Total Score - Q5	/5
Immediate Memory Total Score (all 3 trials) -	/15
Concentration Total Score (Sections A and B) - **Q15**	/5
Delayed Recall Total Score - Q16	/5
COGNITIVE RESULTS ≤ 25 is abnormal	/30

NEUROLOGICAL RESULTS (Q 7-14) ☐ Abnormal (+) ☐ Normal (-)

SYMPTOM RESULTS (Q 3) ☐ 1 or more symptoms (+) ☐ No symptoms (-)

HISTORY RESULTS (Q 4A-4C) ☐ Positive (+) ☐ Negative (-)

VOMS RESULTS (Q 17) ☐ Abnormal (+) ☐ Normal (-) ☐ Deferred

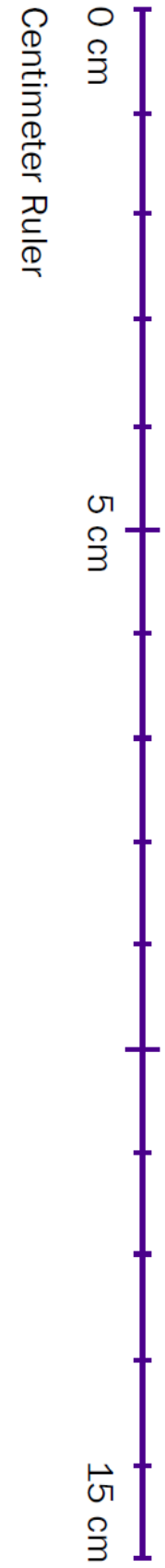
MACE 2 RESULTS ☐ Positive (+) ☐ Negative (-)

AFTER COMPLETING MACE 2:

- ❑ Document MACE 2 results in the EHR with coding instructions.
- ❑ Initiate the Progressive Return to Activity (PRA) Clinical Recommendation beginning with Initial Concussion Management to include 24-hours rest.

Refer to Progressive Return to Activity Clinical Recommendation at Health.mil/TBIProviders

VOMS Equipment Sample 14 point font: **A**



TBI CODING INSTRUCTIONS

If TBI screening is negative, code: Z13.850*

TBI coding sequence:

1. **Primary TBI diagnostic code: S06. E L S E****
2. **Primary symptom code,** if applicable: (e.g., H53.2 - diplopia)
3. **Deployment status code,** if applicable:*** (e.g., Z56.82 for deployed or Z91.82 for history of military deployment)
4. **TBI external cause of morbidity code:** (For example, Y36.290A (A- use for initial visit) for war operations involving other explosions and fragments, military personnel, initial encounter)
5. **Place of occurrence code, if applicable**
6. **Activity code,** if applicable
7. **Personal History of TBI code:** if applicable Z87.820

* MACE 2
** Etiology, Location, Severity, Encounter
*** Deployment code must fall within the first four codes when applicable

For more information, see TBICoE ICD-10 Coding Guidance Tool.

References available at Health.mil/TBIProviders.

We are authorized to collect the information on this form and any supporting documentation, including social security numbers, under the Patient Protection and Affordable Care Act (Public Law No. 111-148), as amended by the Health Care and Education Reconciliation Act of 2010 (Public Law No. 111-152), and the Social Security Act.

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PUID 4901.1.3.8
Released: February 2012 | Revised March 2021
by Traumatic Brian Injury Center of Excellence.
This product is reviewed annually and is current until superseded.

8.38 Return to Activity Post TBI & Concussion Symptom Inventory

RETURN TO ACTIVITY EDUCATIONAL BROCHURE

Guidance for Service Members With Symptoms Following a Concussion

Defense and Veterans Brain Injury Center

WHAT IS A CONCUSSION?

A concussion is a head injury from a hit, blow or jolt to the head that:

- briefly knocks you out (loss of consciousness), or
- may affect your ability to remember information before, during or after the event (post-traumatic amnesia), or
- makes you feel dazed, like you had your bell rung (alteration of consciousness)

A concussion is also known as mild traumatic brain injury (mTBI).

This brochure will help you to recover as quickly and safely as possible. Each stage is designed to help you gradually return to your normal routine, while your brain heals. You may have to stay at one stage longer than another if your symptoms do not go away or return when you try to do more activities. Everyone is different.

Do not rush your progress.

WHAT SHOULD I EXPECT?

- Most people fully recover from concussions.
- Immediately or soon after the injury, you may have the symptoms noted on the table on the following page.
- Symptoms after a concussion can affect your performance, placing the safety of you or your unit at risk.
- These temporary symptoms resolve faster when your brain gets rest, so it is important for you to take time to gradually recover.
- Recovery is different for each person, but symptoms typically improve within hours, and resolve completely within days to weeks.

Red Flags: When Should I Seek Help?

If you experience any of the following, contact your primary care manager immediately:

- passing out or blackouts
- weakness or numbness of any part of the body
- one pupil larger or smaller than the other
- slurred speech or difficulty speaking
- changes in hearing, taste or vision
- difficulty recognizing people
- not knowing where you are
- worsening headache
- unsteady on feet
- seizures
- vomiting
- unusual behavior
- double vision
- something just isn't right

Released: January 2014 | Revised: April 2020 by Defense and Veterans Brain Injury Center.
This product is reviewed annually and is current until superseded. 800-870-9244 • dvbic.dcoe.mil
4306.1.2.3

AVOID

- caffeine (it interferes with sleep)
- tobacco products
- sleeping aids or drugs, unless recommended to you by your health care provider

RATE YOUR SYMPTOMS:

Each morning, rate your symptoms based on the table on the following page from 0-4.

0 = Rarely or never present. (**None**)
1 = Occasionally present but doesn't disrupt my activities. (**Mild**)
2 = Often present and occasionally disrupts my activities. I feel somewhat concerned. (**Moderate**)
3 = More frequently present and disrupts my activities. I can only do fairly easy, simple things. I feel I need help. (**Severe**)
4 = Almost always present. I can't perform at work, school or home because of it and I need help. (**Very Severe**)

HOW DO I FEEL TODAY?

RATE ON A SCALE OF 0 4	0	1	2	3	4
Feeling dizzy					
Loss of balance					
Poor coordination, clumsy					
Headaches					
Nausea					
Vision problems, blurring, trouble seeing					
Sensitivity to light					
Hearing difficulty					
Sensitivity to noise					
Numbness or tingling on parts of my body					
Change in taste and/or smell					
Loss of appetite or increased appetite					
Poor concentration, can't pay attention, easily distracted					
Forgetfulness, can't remember things					
Difficulty making decisions					
Slowed thinking, difficulty getting organized, can't finish things					
Fatigue, loss of energy, getting tired easily					
Difficulty falling or staying asleep					
Feeling anxious or tense					
Feeling depressed or sad					
Irritability, easily annoyed					
Poor frustration tolerance, feeling easily overwhelmed by things					

Based on Neurobehavioral Symptom Inventory (NSI)
Used with permission: Cicerone,KD: J Head Tr Rehabil 1995;10(3):1-17.

DAILY GUIDANCE

- Complete the table on the previous page every morning. If you rate your symptoms as None or Mild (0-1), then move on to the next stage.
- If any symptoms get worse or you develop new ones, immediately stop what you are doing and rest for the remainder of that day.
- If your symptoms go away or are rated as mild (0-1) the next morning, you may carefully try the activities that you were doing the day before. Make certain that you follow the guidelines closely and do a little less of the activity that caused your symptoms to worsen.
- If your symptoms are rated at 2 or higher on the NSI the next morning, go back to the last stage where you had no symptoms. Stay at that stage and contact your Primary Care Manager for further instructions.

WHAT SHOULD I DO?

After Mandatory 24 Hours of Recovery:

❑ Stage 1: Rest

Rest or do very light activity for another 24 hours. Only do basic things like eating, using the bathroom, resting and sleeping.

- Keep your head above your heart (when you put on your shoes, bring your foot to your knee).
- Sit down when dressing and showering if needed.
- Walk on level surfaces at an easy pace.
- Limit head movements that cause symptoms.
- Stay in a quiet environment with low lighting.
- Watch periods of television with rest breaks each hour.
- Sleep as needed.
- Dress comfortably.

After this stage, see your primary care manager to discuss symptoms and determine next steps.

DO NOT!

- work or study
- drink alcohol
- exercise
- drive
- hold your breath or grunt*
- exert yourself to the point of making your heart race
- play video games

*Pay attention to whether you are holding your breath when you bend over or are under stress.

❑ Stage 2: Light Routine Activity

You may wear a uniform and boots.
May perform these activities no longer than 30 minutes:

- walk and stretch
- ride a stationary bike at a slow pace with low resistance
- no light housework
- use the computer
- play simple games, such as cards

DO NOT!

- drink alcohol
- drive
- play video games
- do resistance training or repetitive lifting
- do sit-ups, push-ups or pull-ups
- go to crowded areas where you may be bumped into

❑ Stage 3: Light Occupation-oriented Activity

May perform these activities no longer than 60 minutes:

- lift and carry objects less than 20 pounds
- take a brisk walk
- ride in car and look around
- use an elliptical machine or stair climber
- perform light military tasks such as cleaning equipment

May perform these activities no longer than 30 minutes:

- shop for one item at the store
- talk to someone as you walk
- gently increase your exposure to light and noise
- perform a maintenance check on a vehicle

DO NOT!

- drink alcohol
- drive
- play video games
- do resistance training or repetitive lifting
- go to crowded places
- participate in combatives or contact sports

❑ Stage 4: Moderate Activity

You may wear personal protective equipment.

May perform these activities no longer than **90 minutes**:

- take a brisk walk
- do light resistance training
- participate in non-contact sports
- perform moderate job-related tasks
- climb, crawl or jog

May perform these activities no longer than 40 minutes:

- play video games, foosball, putting and ping pong
- play strategy games such as chess or sudoku
- shop for groceries
- perform target practice
- drive in a simulator

DO NOT!

- drink alcohol
- participate in combatives or contact sports
- drive

❑ Stage 5: Intensive Activity

- Resume normal routine and exercise.
- Participate in normal military, training and social activities.
- Use night vision goggles, take part in simulations, or be exposed to bright light.

See your primary care manager in the morning after completing this stage to complete exertional testing.

- Start driving again.
- Do heavy job-related tasks, such as digging.
- Communicate by signals during patrol duty or use radio communication.

DO NOT!

- drink alcohol
- participate in combatives or contact sports
- go outside the wire in a combat zone

❑ Stage 6: Unrestricted Activity

- Return to pre-injury activities.

If your heart starts to race, immediately STOP what you are doing and rest.

Practice good sleep habits (get 7-8 hours)
See Healthy Sleep fact sheet at dvbic.dcoe.mil.

Do you have questions about this fact sheet? Feedback? Email dha.dvbicinfo@mail.mil.

8.39 Newborn APGAR Scale

N.B.: For reporting the status of a newborn infant and response to resuscitation.

	Sign	0 Points	1 Point	2 Points	1 Min	5 Min
A	Activity (muscle tone)	Absent	Arms and legs flexed	Active movement		
P	Pulse	Absent	Below 100 beats/min	Above 100 beats/min		
G	Grimace (reflex irritability)	No response	Grimace	Sneezing, coughing, pulling away		
A	Appearance (skin colour)	Blue-grey, pale	Normal, except extremities	Normal over entire body		
R	Respiration	Absent	Slow, irregular	Good, crying		
				Total		

8.40 Pediatric Tables

	Preterm	Term	6 months	1 year	3 years	6 years
Weight (lbs)	3	7.5	15	22	33	44
Weight (kg)	1.5	3.5	7	10	15	20
Heart Rate	140	125	120	120	110	100
Respirations	40-60	40-60	24-26	22-30	20-26	20-24
Systolic BP	50-60	70	90 ± 30	95 ± 30	100 ± 25	100v ± 15
Fluid Challenge (mL)	30	70	140	200	300	400
Fluid Maint. (mL/h)	6	14	28	40	60	80

	8 years	10 years	11 years	12 years	14 years
Weight (lbs)	55	66	77	88	99
Weight (kg)	25	30	35	40	45
Heart Rate	90	90	85	85	80
Respirations	18-22	18-22	18-22	18-22	14-20
Systolic BP	105 ± 15	110 ± 20	110 ± 20	115 ± 20	115 ± 20
Fluid Challenge (mL)	500	500	500	500	500
Fluid Maint. (mL/h)	100	100	100	100	100

8.41 Emergency Childbirth – Normal Delivery

Indications:

- Inspect vagina to determine if head is visible. If the area of the head is larger than a $2.00 coin then birthing is likely to occur within the next few minutes.

Considerations:

- If birthing is going to be delayed, place in the recumbent position, on her left side. Consider transport.

Caution:

- Do not let the mother use the washroom.

Equipment:

- Oxygen
- Gloves (Sterile, if possible)
- Bulb Syringe
- Clamps x 2
- Scissors

Procedure:

1. Assess the mother to include discharge, length of labor, prenatal events, medical history, vital signs, pulse oximeter reading, and previous birthing history.
2. Reassure mother.
3. Administer oxygen.
4. Place mother on her back with knees bent and spread apart.
5. Place clean material under buttocks to slightly elevate.
6. Don gloves (sterile if possible)
7. Contact SMA.
8. Encourage mother not to bear down or strain during each contraction. Have her breathe with short panting breaths during contractions and deep breaths between contractions.
9. As the baby's head presents ensure that the membrane is torn. If it is not torn, gently grasp and tear with a haemostat. Ensure that the membrane is away from the nose and mouth of the baby.
10. As the head comes out place one hand over the head and apply gentle pressure in order to prevent the head from suddenly emerging. Support the head as it rotates.
11. Feel around the baby's neck for a loop of the umbilical cord (may not be present). If present, slip over the baby's head.
12. Clear mouth and nose with bulb syringe.
13. Support head and neck and lift slightly to help the shoulders emerge.
14. As the body emerges grasp firmly and support. Keep at level of the vagina.
15. Clamp and cut the umbilical cord. Place one clamp 10 cm from the baby and the second clamp 5 cm further away. Cut the cord between the two clamps.
16. Dry baby immediately and keep warm.
17. Assess baby after 30 seconds. If not breathing start artificial respiration.
18. Record time of birth and conduct initial APGAR score.
19. Assess mother. Massage fundus to help deliver the placenta and decrease bleeding.
20. If placenta delivers, place in garbage bag and transport with mother. Do not delay transport to wait for placental delivery.
21. Transport casualty

8.42 Emergency Childbirth – Abnormal Presentation:

Indications:

- Inspect vagina to determine if head is visible. If abnormal presentation such as breech, prolapsed cord, or limb presentation, place mother in the Trendelenburg or knee-chest position.

Considerations:

- If abnormal presentation is evident, rapid transport is critical.

Caution:

- Do not let the mother use the washroom.

Procedure:

1. Assess the mother to include discharge, length of labor, prenatal events, medical history, vital signs, pulse oximeter reading, and previous birthing history.
2. Reassure mother.
3. Administer oxygen.
4. Place mother on her back with knees bent and spread apart.
5. Place clean material under buttocks to slightly elevate.
6. Don gloves (sterile if possible)
7. Initiate rapid transport.
8. Contact SMA.
9. If cord is prolapsed apply a saline moistened dressing. Do not pull or replace cord in vagina.

8.43 Columbia Suicide Severity Rating Scale

This form uses JavaScript. If you see a **YELLOW BAR** above, click on '**Options**' → '***Enable JavaScript for this document one time only.***'

National Defence / Défense nationale

CAN PROTECTED B (When completed)

Columbia - Suicide Severity Rating Scale (C-SSRS) Screen Version

☐ For Sign-off

Patient

SN	Rank	Last name	First name	DOB *(yyyy-mm-dd)*

Suicide ideation definitions and prompts		
Ask questions that are **bolded** and **underlined**.	☐ **Past month** ☐ **Since last visit**	
Ask Questions 1 and 2	**Yes**	**No**
1) **Have you wished you were dead or wished you could go to sleep and not wake up?**	☐	☐
2) **Have you actually had any thoughts of killing yourself?**	☐	☐
If "**Yes**" to 2, ask Questions 3, 4, 5, and 6. If "**No**" to 2, go directly to Question 6.		
3) **Have you been thinking about how you might do this?** E.g. *"I thought about taking an overdose but I never made a specific plan as to when where or how I would actually do it….and I would never go through with it."*	☐	☐
4) **Have you had these thoughts and had some intention of acting on them?** As opposed to *"I have the thoughts but I definitely will not do anything about them."*	☐	☐
5) **Have you started to work out or worked out the details of how to kill yourself?** **Do you intend to carry out this plan?**	☐	☐
	Yes	**No**
6) **Have you ever done anything, started to do anything, or prepared to do anything to end your life?** Examples: Collected pills, obtained a gun, gave away valuables, wrote a will or suicide note, took out pills but didn't swallow any, held a gun but changed your mind or it was grabbed from your hand, went to the roof but didn't jump; or actually took pills, tried to shoot yourself, cut yourself, tried to hang yourself, etc.	☐	☐
If "**Yes**", ask: **Was this within the past three months?**	☐	☐

☐ Low Risk
☐ Moderate Risk
☐ High Risk

Comments / Interpretations of findings

Clinician

Rank	Last name	First name
Date *(yyyy-mm-dd)*	Signature	

**** This is a tool to assist with questioning and giving handover. You are NOT allowed to diagnose.**

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CAN PROTECTED B (When completed)

8.44 Prolonged Casualty Care (HITMAN)

Indications:
Transit and/or evacuation time to higher level care is delayed (≥1hr) or unknown.

H – Head to Toe Assessment/ Hydration/ Hypothermia/ Hygiene

- Perform secondary survey and reassess head to toe every 4-8hrs.
- Infuse warmed fluids whenever possible.
- Consider oral rehydration with electrolyte where appropriate.
- Fluid administration requires monitoring of urinary output. If necessary (under order), perform 8.25 Bladder Catheterization, 8.26 Urinary Catheterization Output, document, and trend.
- Thermal management to avoid hypo/hyperthermia.
- Patient hygiene.

I – Infection/ Increased Compartmental Pressures

- Assess for signs of infection/sepsis: Suspected source of infection AND any of the following may suggest sepsis: shivering, fever (≥38), or very cold (≤36), low SBP (≤90), high HR (≥90 BPM), high RR (≥20 breaths/min), SOB, altered LOC, extreme pain).
- Use the same thermometer and location (oral, axillary rectal) or accurate temp trending.
- Consider Protocol 4.2 Antibiotic.
- Clean contaminated wounds if practical.
- Monitor wounds and venipuncture sites for redness, swelling or discharge.
- Monitor for signs of rising intracranial pressure (ICP). Refer to Protocol 3.12 Severe TBI. - Beware of compartment syndrome in extremities, particularly in patients with a decreased LOC (who cannot verbalize extreme pain).

T – Tube management/ Tidy up/ Tourniquet Removal

- Tidy up IV lines, catheter tubing and Vital Stats monitoring equipment. This alleviates inadvertent kinks or tangles, making equipment trouble-shooting more efficient.
- Collect and dispose of trash generated by the use of medical equipment and consider re-stocking ready-use kits (IV Pocket, Dressing Pocket, etc.) from the Sup Kit if required or available.
- If applicable, refer to Procedure 8.2 Tourniquet Assessment Removal or Conversion

M – Medications

- Recheck the 6 Rights.
- Is the medication still indicated (i.e. pain relief)? Determine re-dosing intervals (as applicable).
- Are there any new contraindications (i.e. change in patient vital signs, LOC)?
- Confirm amount of medication on hand and manage supply.

A – Analgesia

- Consider patient comfort factors (not too hot/cold, position of comfort, loosen restrictive clothing and devices).
- Release tight fitting stiff neck collar if possible while maintaining SMR.
- Develop an analgesic plan to manage pain. Try to avoid allowing pain medication from wearing off completely when it is still indicated. - Consider head up positioning for comfort.
- Pad bony prominences and areas where circulation could be impeded.
- Encourage position changes in conscious patients and roll patients with a decreased LOC every 2hrs to avoid pressure sores.

N – Nursing Care/Nutrition/Notes

- Feed patients when it is appropriate. Consider anti-emetic medication for nausea.
- Document and trend vital signs.

8.45 Prolonged Casualty Care Plan

12 Hour Care Plan

	Patient ID:		Tim	T+0.5	T+1.0	T+1.5	T+2.0	T+2.5	T+3.0	T+3.5	T+4.0	T+4.5	T+5.0	T+5.5	T+6.0	T+6.5	T+7.0	T+7.5	T+8.0	T+8.5	T+9.0	T+9.5	T+10.	T+10.	T+11.	T+11.	T+12.0
	Action: (suggested interval)	Interval																									
Vitals	Check BP/ HR/T SPO2 /ETCO2 (Q																										
	Cherck Peripheral Pulses (Q1H)																										
	Check Skin Temp and Color (Q1H)																										
	Check Blood Glucsoe Level (Q1H)																										
Ins/Outs	Check Drip Rates/Fluids (Q1H)																										
	Check Urine Output (Q1H)																										
	Check Urine Dipstick (Q1H)																										
	Perform Foley Care (Q24H)																										
	Flush Locks PRN (Q8H)																										
Pain	Check GCS/ Pain (Q1H)																										
	Give Pain Meds (per protocol)																										
HEENT	Perform Oral Suction (PRN)																										
	Perform Nasal Care/ Moisten																										
	Perform Oral Care/Moisten (Q																										
	Apply Lip Balm (Q1H)																										
	Apply Eye Onitment/Drops (pe																										
	Brush Teeth (Q12H)																										
	Change Tape (Q24H)																										
Integumentary	Check S/S Compartment Syndr																										
	Reposition (Q2H)																										
	Check Padding (Q2H)																										
	Perform LE Massage (Q2H)																										
	Check Dressings (Q4H)																										
	Do A/P Limb ROM (Q8H)																										
	Wash and Dry Skin (Q24H)																										
	Perform Burn Skin Care (Q24H																										
	Irrigate Wounds (Q24H)																										
	Debride Wounds (Q24H)																										
	Change Dressings (Q24H)																										
	Give Antibiotics Rx (Q24H)																										
Integamentary	Check S/S Compartment Syndr																										
	Reposition (Q2H)																										
	Check Padding (Q2H)																										
	Check Dressing (Q4H)																										
	Do A/P Limb ROM (Q8H)																										
	Wash and Dry Skin (Q24)																										
	Irrigate Wounds (Q24H)																										
	Give Antibiotics (Q24H)																										
	Change Dressing (Q24H)																										
Gastrointestinal	Give Antiemetic RX (as per pr																										
	Auscultate Abdomen (Q2H)																										
	Palapate Abdomen (Q2H)																										
	Give Food/ Nutrition (Q8H)																										
Extra Stuf	Check O2 Supply																										
	Check/ Change Battteries																										
	Compression Socks/Stockings																										

8.46 Priming a Blood Line

Indication:

- Protocol 3.5 Blood in Adults

Procedure:

1. Prime IV/IO blood tubing:
    a. Single spike- prime with blood unit; **or**
    b. Y-type double spike – prime with 250mL 0.9% Sodium Chloride (Normal Saline or NS) IVF first, then spike with blood unit.
    c. If using an IV fluid warmer, connect IV blood tubing to fluid warming extension set. Turn on IV fluid warmer and operate as per product instructions;
    d. Ensure all clamps on IV blood tubing are closed;
    e. Expose port on blood unit;
    f. Using firm pressure, insert blood tubing spike into blood unit port. Twist spike in clockwise direction ¼ turn until spike is fully inserted;
    g. Keeping blood bag above filter, unclamp tubing between blood bag (single spike) or NS bag (Y-type double spike);
    h. Squeeze and release bottom of filter to prime the simulated blood or NS.
        i. **IMPORTANT**: the blood/NS must cover the filter entirely so the filter can remove clots, cellular debris and coagulated protein. Do not overfill the chamber, allow for space between the filer and drip chamber to visualize flow during administration; and
        ii. Open IV clamps below filter and prime the remainder of the tubing. If priming with NS, clamp tubing between NS bag and filter once line is primed.
2. Connect IV blood tubing to IV/IO catheter.
3. Ensure all clamps between blood bag and patient are open, infuse the blood.

8.47 Blood Administration Documentation

Indication:

- Administering blood and/or blood products as per Protocol 3.5 Blood in Adults

Procedure:

1. Document blood administration details on CF2061, casualty card and any other documentation including:

    a. Patient identifier (Name, SN);
    b. Date;
    c. Vital signs (minimum: pre/post administration);
    d. Clinical signs/indicators for blood administration (see Protocol 3.5 Blood in Adults) or adverse reactions/interventions;
    e. Blood product information (name and group, volume, route, time of administration);
    f. Affix blood label from blood unit to documents.

2. Document adverse reactions to blood administration on CF 2061, CF 2062 and TCCC including:
    a. Date and time of administration;
    b. Clinical and vital signs observed;
    c. Interventions applied.

3. If administering Surgeon General Restricted Items (i.e. freeze-dried plasma), return to the product issuer (i.e. Pharmacy Officer, Medical Officer) to complete documentation on administration and any adverse reaction with details as above.